

ARTU SERIES – 50Hz ROOFTOP UNITS

20-120RT

Multi-functional Modular Combination

High Efficiency & Energy Saving



Keeping Technology Cool



AIRFLOW

FLEXIBLE, PERSONABLE, DRIVEN

Michael Weil, the famous enterprise critic of 《Contracting Business》, summed up Airflow, a company founded in 1959 in Frederick, Maryland, with three words: Flexible, Personable, Driven.

Seldom companies like Airflow can obtain such success in a special field. For decades, Airflow has been targeting three market segments—highly specialized military applications, computer room air conditioning, and industrial dehumidification. Airflow offers a variety of applications covering military, communicating, computing and precision electrical manufacturing fields. The product type includes military & industrial equipments, computer room air conditioning, Dryomatic Drycell dehumidifier and Industrial air handling units etc.

Except US government and military, Airflow customers also contains so many famous companies or institutions worldwide like NASA, CBS, 3M, Boeing, XEROX, Microsoft, MCI, VISA, Bell, IBM, Hughes, Honeywell, Motorola, i-State, America Online, Federal Express, City Bank, General Electric, Israel Telecom, China Telecom, China Unicom etc. Airflow products provide reliable environment for modern top equipments.

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ARTU Series Rooftop Units

Airflow ARTU series rooftop units aims to create the best indoor environment, it offers solutions for environmental control of comfort or crafts, widely used for office building, hospital, school, restaurant, exhibition hall,, precision manufactory, electronic equipment space and warehouse etc..

ARTU series can meet the efficiency standard of ASHRAE90.1, in despite of satisfying customer demand, ARTU series offers the best choice to minimize running costs.

With its flexible, reliable and independent mode, ARTU series can realize cooling, heating, air filtration, heat recovery and more additional function, the cooling capacity is from 20 to 120ton, providing you with different ideal combinations.

ARTU series has advanced design and high standard quality control which ensures high reliability and low maintenance cost, Airflow brings customer genuine value and perfect experience.





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Features

High efficiency

ARTU series rooftop units is equipped with several high efficiency scroll compressors and multiple independent refrigeration systems to realize cooling capacity control, thus meeting the load demand of cooling/heating accurately.

The coil heat exchanger is of finned tubular, high efficiency, which greatly improves the efficiency of refrigeration circulation.

Optional variable speed fan motor will supply proper airflow to satisfy temperature control, and save running electric power accordingly.

Optional air return heat recovery and economizer may use more outdoor capacity to reduce compressor running hours under low ambient temperature.

All high efficiency and energy saving functions are designed to save running cost and bring the owner maximum merit.



ARTU070-ARTU100 unit

Flexibility

ARTU series rooftop units is available to connect horizontal air discharge/return from the side of the unit, or vertical air discharge/return from the bottom of the unit directly, this may be used for replacing old equipment or a newly-built system.

ARTU140-420 units can be assembled as a whole in the factory or divided into several functional modules for easy transport, rigging and installation. It can also meet every special demand by adding additional functions such as economizer, dynamic discharge module, compressor discharge reheat coil with humidity control and anti-corrosion air heat exchanger etc.

Air quality control

ARTU series has multiple designs and optional features to ensure optimum indoor air quality, which includes adopting the housing structure of double-layer metal panel, heat recovery circulation based on outdoor temperature and indoor air CO₂ concentration, stainless steel condensate pan, high efficiency air filter etc.

Maintainability

ARTU series ensures the unit with minimum maintenance service expense within its life. The unit has a service door for easy maintenance, intelligence control system, remote monitoring system (single point connection available), and an in-built self-diagnosing unit function etc.



ARTU140-ARTU420 unit



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Standard Functions

- Bottom air discharge and return;
- The housing and frames are constructed of galvanized steel plate, with anti-ultraviolet radiation coating painted on surface. The housing is of double-layer structure with high-density insulation (50mm) between the two layers;
- The unit has been designed with a service door in the side of the blower, evaporating coil, compressor and electrical box installed. The gasket around the service door avoids leakage of air and rainwater. Special door lock is fixed to avoid service door being opened by unauthorized personnel.
- Evaporator terminal block keep the expansion valve outside of air channel, this enables the unit being commissioned and tested with unit running;
- For model ARTU140-420, service jacklight and AC220V/50Hz power socket are equipped inside the unit;
- Model ARTU070~100 uses 2 paralleled scroll compressors, 2 refrigeration circuit, 2-stage cooling capacity control; model ARTU140~420 uses 4 scroll compressors (every two in parallel) , 2 refrigeration circuit, 4-stage cooling capacity control;
- Each compressor has oil heater to avoid excessive refrigerant being dissolved into compressor lubricant under low ambient temperature, thus result in lubrication failure;
- Indoor blower is of heavy gauge centrifugal blower for enhancing dual-belt drive, the motor base is adjustable, and the pulley pitch diameter can be adjusted to suit field belt tension and control requirement for air flow and pressure;
- Evaporator and condenser are constructed of high efficiency copper tube aluminum fin, with hydrophilic film on surface to reduce condensate water obliquity and form water bridge, thus decrease air resistant for wet coil;
- The drain pan on the bottom of evaporator is made of galvanized steel plate, with powder coated anti-rust treatment. The drain pan is installed in a certain slope to ensure fluent discharge of condensate water;
- Condenser fan is axial type and running by stages according to compressor ambient temperature and discharge pressure, this may save electric power of blower and ensure its normal operation under low temperature, suitable for cooling operation under 5°C ambient.
- Condenser coil protective fence made of steel wire provide protection for the condenser coil;
- The unit is designed for IP55 to meet the demand for outdoor installation;
- The unit is assembled and tested as a whole before shipment;
- Fresh air gap has shield, cleaning fresh air filter, and fresh air valve controlled manually;
- Conform to ASHRAE52.2 standard, 51mm thickness replaceable air filter;
- R22 refrigerant;



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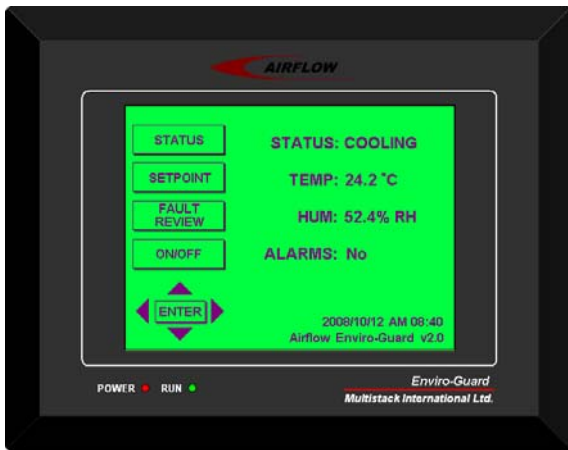
Optional Functions

- Model ARTU140-420 can be part shipped with blower & evaporating coil section and compressor condensing section, and installed on site, suitable for small installation applications;
- Horizontal return air inlet in side or rear of unit, horizontal supply air outlet in side of unit, air duct flange;
- High static centrifugal blower, based on field supply air pressure;
- Indoor variable frequency & speed fan motor prepared for variable air volume (VAV);
- Factory/field installed dynamic discharge module, includes discharge blower (variable frequency blower be optional), discharge air outlet shield and motorized damper;
- Factory/field installed heat recovery, used between air discharge and fresh air, heat recovery is available to select surface heat exchanger or total rotary heat exchanger;
- Factory/field installed economizer and controller, will automatically regulate the opening of air discharge and fresh air motorized damper according to temperature difference of outdoor and indoor, and utilize outdoor capacity to save cost in season with low temperature;
- Return air fan installed in unit return air side (air discharge fan is not available to install together);
- Hot gas bypass control system is used for continuous control of unit capacity and stable operation under low load;
- Electrode humidifier, dry steam humidifier, or other kinds of humidifier;
- Compressor discharge reheat coil, installed behind of evaporating coil, is a substitute of electric reheat, when air humidity control is required, it can provide temperature compensation to dehumidified air using compressor heat discharge, so as to save running electric power;
- Ni-Cr fin tube electric reheat (multi-stage heating);
- Coil heater using hot water or steam;
- Middle or high efficiency air filter;
- Unit installation base is suitable for unit with bottom air supply and air return, installed on top of floor and connected with indoor supply/return air duct;
- Variable frequency & speed condensate blower, suitable for cooling operation under -15°C ambient;
- Stainless steel drain pan;
- Coil protective panel, made of steel plate with louver ventilated, prevent condenser from being damaged by hail or other external object;
- Anti-corrosion stainless steel housing, suitable for operation under salt-fog environment, and finned condenser coil;
- Indoor CO₂ concentration sensor;
- R134A, R407C, R410A refrigerant;



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EG (*Enviro-Guard™*) Control System



AIRFLOW EG (*Enviro-Guard™*) microprocessor control system provides powerful functions for environment control, it continuously monitors the ambient temperature, humidity and air quality, and intelligently controls the air handling unit for cooling, heating, dehumidification and humidification etc., so that keep the air parameter in a desired range.

EG controller uses a large screen that installed inside the room to display the following unit data (the data showed depends on each unit model):

- Cooling/heating/dehumidification/humidification
- Return air temperature/humidity
- Cooling output stage
- Heating output stage
- Current fault alarm

EG controller will monitor the following fault conditions and provide protection to the unit or activate alarms once fault condition occurs (the fault conditions depend on unit model) :

- High discharge pressure
- Low suction pressure
- High motor coil temperature
- Low evaporator temperature
- Blower motor overload
- Electric reheat overload

- Low/loss of air flow
- High/low indoor temperature
- High/low indoor humidity
- Clogged filter
- Smoke detector (option)
- High CO₂ concentration

EG controller will record the latest 200 fault alarms and display under each alarm the reason and unit running status when the alarm occurs. This kind of alarm record provides the maintenance personnel prompt and accurate fault instructions.

EG controller will automatically accumulate running hours of main parts such as compressor, blower and humidifier etc., and can be set for periodical maintenance service alarm.

EG controller can build 3 pre-set self-running hours, this enables the unit start and close according to pre-set timing program automatically without personnel on site.

In EG controller system, the setting and modification of all control parameters can only be done with password authorized by the administrator.





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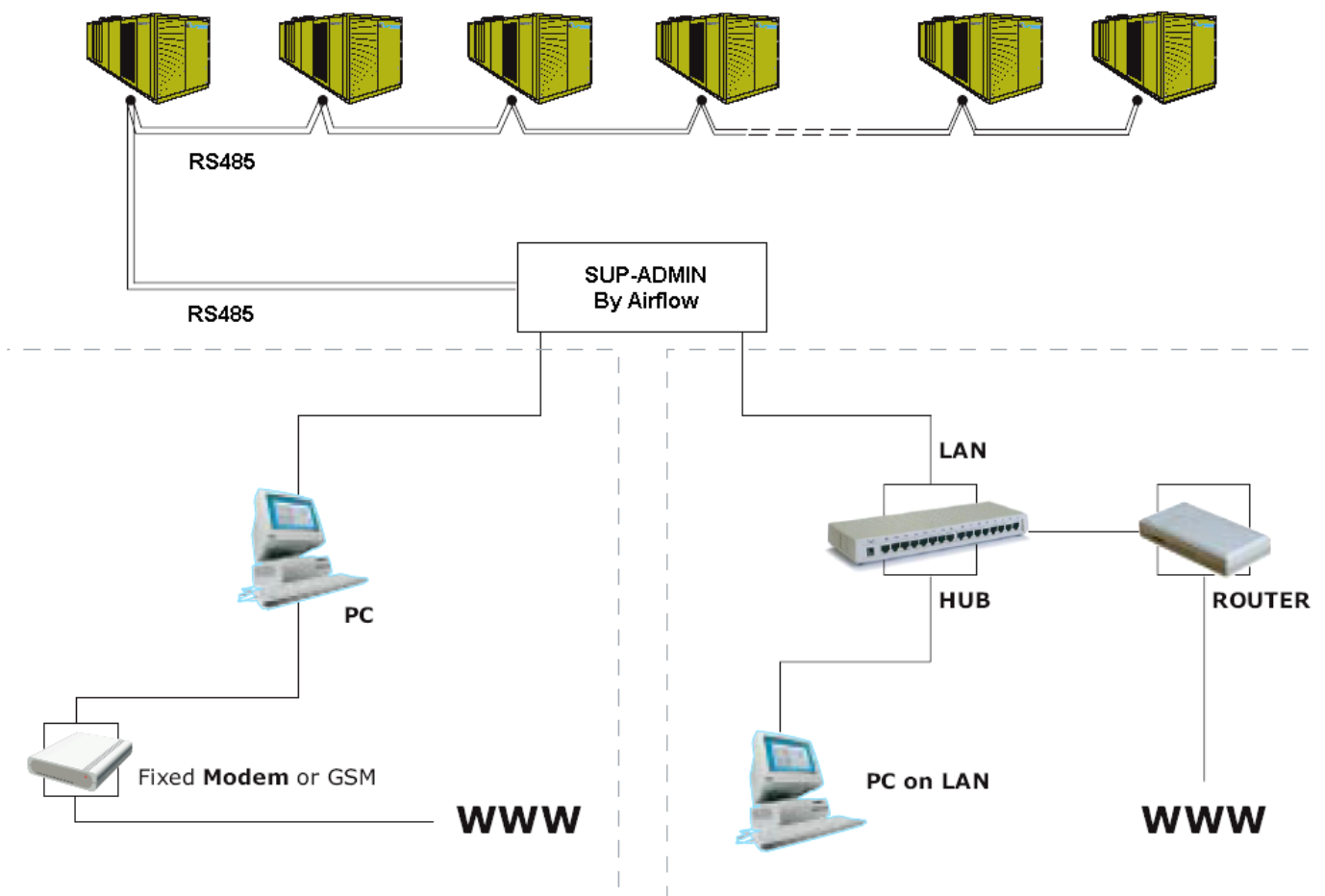
EG (*Enviro-GuardTM*) Control System

The second communication port of EG control system solid IC board provides channel for removable manual operating machine (for service purpose), when checking and servicing the equipment, the user may read the unit parameters directly in the field instead of reviewing terminal controller, it also controls the unit running, and offers the biggest convenience for unit commissioning and maintenance service.

EG control system is fitted with RS485 serial port to enable remote control and monitor, except ASCII, ModBus, BacNet, the EG control system also be opened to other agreements.

Airflow super administrator system (Sup-Admin) can remote control a group of units on any PC, which has installed the Sup-Admin software, through communication cable or LAN connected directly. Remote control is available for reviewing running status, fault record of each unit, printing the running record of the past period of time, and modifying unit parameters.

For all Airflow products installed in any place the worldwide, customers can obtain support and help from Airflow technical experts through the Sup-Admin system.





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Model Designation

ARTU 070 C F 1 - C E 1 E A 1
1 2 3 4 5 6 7 8 9 10 11

1—ARTU Series

2—Model data

3—C: single cooling

H: heat pump

P: precision

4—Refrigerant

E: R134A

F: R22

G: R410A

R: R407C

5—Airflow type

1: bottom return/supply

2: horizontal side return/supply

3: bottom return, horizontal side supply

4: horizontal side return, bottom supply

5: horizontal rear return, bottom supply

6: horizontal rear return/side supply

6—Indoor blower type

C: fixed speed blower for constant air flow

V: variable frequency blower for VAV

7—Assistant heater type

N: none

E: electrical

S: steam

W: hot water

8—Compressor discharge reheat with humidity control

1: N

2: Y

9—Dynamic discharge & heat recovery economizer

N: none

E: dynamic discharge with economizer

P: dynamic discharge without economizer

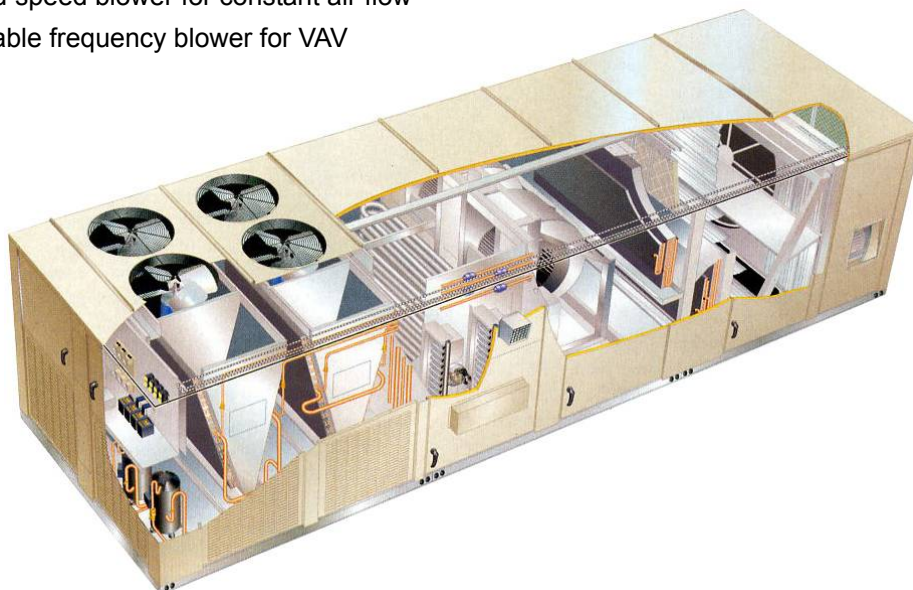
R: return air blower

10—Power supply

A: 380-415V/50Hz/3Ph

B: 460-480V/60 Hz/3Ph

11—Product development index





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Technical Data

Model		ARTU070C/H	ARTU080C/H	ARTU095C/H	ARTU100C/H	ARTU140C/H
Total cooling capacity	kw	69	80	94	101	139
Net cooling capacity	kw	67	78	90	98	134
Total cooling capacity (heat pump) ①	kw	66	76	90	98	133
Compressor						
Type		Scroll	Scroll	Scroll	Scroll	Scroll
Quantity		2	2	2	2	4
Refrigeration circuit		1	1	1	1	2
Refrigerant		R22	R22	R22	R22	R22
Power	kw	17.0	19.5	23.9	26.3	34.0
Heat pump power①	kw	14.7	16.9	21.4	23.4	29.4
Evaporator & indoor blower						
Evaporator type		Fin coil	Fin coil	Fin coil	Fin coil	Fin coil
Nominal air flow	m ³ /h	11780	13600	15900	17200	23600
Ex-static pressure	Pa	250	250	250	250	300
Blower type		Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Blower quantity		1	1	1	1	1
Blower power	kw	2.3	2.3	3.3	3.3	5.0
Motor nominal power	kw	3.0	3.0	5.5	5.5	7.5
Condenser & cooling fan						
Condenser type		Fin coil	Fin coil	Fin coil	Fin coil	Fin coil
Cooling fan type		Axial	Axial	Axial	Axial	Axial
Fan power/each		1.18	1.18	1.75	1.75	1.18
No of fan		2	2	2	2	4
Total air flow	m ³ /h	26020	26020	38640	38640	52040
Electric reheat②						
Type		Fin tube	Fin tube	Fin tube	Fin tube	Fin tube
Power per stage	kw	15-30-45	15-30-45	15-30-45	15-30-45	25-50-75
Electrode humidifier②						
Capacity	kg/h	15	15	25	25	35
Power	kw	11.25	11.25	18.75	18.75	26.25



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ARTU160C/H	ARTU190C/H	ARTU205C/H	ARTU240C/H	ARTU275C/H	ARTU350C/H	ARTU420C/H
160	187	203	238	273	350	421
155	180	196	227	262	331	402
152	181	196	232	264	340	410

Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
4	4	4	4	4	4	4
2	2	2	2	2	2	2
R22	R22	R22	R22	R22	R22	R22
39.1	47.9	52.5	61.3	70.1	88.6	105.8
33.9	42.7	46.7	54.3	61.8	76.6	93.0

Fin coil	Fin coil	Fin coil	Fin coil	Fin coil	Fin coil	Fin coil
27200	31800	34400	40400	46300	59400	71500
300	300	300	400	400	400	400
Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
1	1	1	1	1	1	1
5.0	6.9	6.9	10.6	10.6	18.9	18.9
7.5	7.5	7.5	11.0	11.0	22.0	22.0

Fin coil	Fin coil	Fin coil	Fin coil	Fin coil	Fin coil	Fin coil
Axial	Axial	Axial	Axial	Axial	Axial	Axial
1.18	1.75	1.75	1.75	2.33	2.33	2.33
4	4	4	4	4	6	6
52040	77280	77280	77280	109120	163680	163680

Fin tube	Fin tube	Fin tube	Fin tube	Fin tube	Fin tube	Fin tube
25-50-75	25-50-75	25-50-75	50-100-150	50-100-150	50-100-150	50-100-150
35	45	45	65	65	90	90
26.25	33.75	33.75	48.75	48.75	67.50	67.50



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Technical Data (continued)

Model		ARTU070C/H	ARTU080C/H	ARTU095C/H	ARTU100C/H	ARTU140C/H
Dynamic discharge module□						
Max. air discharge	m ³ /h	4123	4760	5565	6020	8260
Ex-static pressure	Pa	50	50	50	50	50
Fan type		Axial	Axial	Axial	Axial	Centrifugal
No of fan		3	3	3	3	2
Motor power/each	kw	0.14	0.14	0.24	0.24	0.14
Dimensions						
Length□	mm	3950	3950	3950	3950	9950
Width	mm	2250	2250	2250	2250	2250
Height	mm	1750	1750	1750	1750	2300
Weight④						
Shipping weight	kg	1555	1905	2165	2505	3916
Operating weight	kg	1520	1870	2130	2470	3746
Shipping weight□	kg	1565	1915	2175	2515	3941
Operating weight□	kg	1530	1880	2140	2480	3771

Remark:

- Cooling operation: indoor air return 27□DB /19□WB; outdoor 35□DB/24□WB
Heat pump heating: indoor air return 20□DB/15□WB; outdoor 7□DB/6□WB
- ①For heat pump unit only
②Optional function
③The length of ARTU140-ARTU420 only includes compressor condensing module, discharge plenum, air supply module, evaporator module, return air plenum module.
④The weight excludes weights of optional parts.



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ARTU160C/H	ARTU190C/H	ARTU205C/H	ARTU240C/H	ARTU275C/H	ARTU350C/H	ARTU420C/H
9520	11130	12040	14140	16205	20790	25025
50	50	50	75	75	75	75
Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
2	2	2	2	2	2	2
0.14	0.24	0.24	0.49	0.49	1.58	1.58
9950	9950	9950	10900	10900	12000	12000
2250	2250	2250	2250	2250	2250	2250
2300	2300	2300	2300	2300	2300	2300
4052	4240	4590	5037	5368	5750	6180
3882	4072	4420	4817	5148	5530	5960
4082	4270	4620	5077	5408	5800	6230
3912	4102	4450	4857	5188	5580	6010

Installation

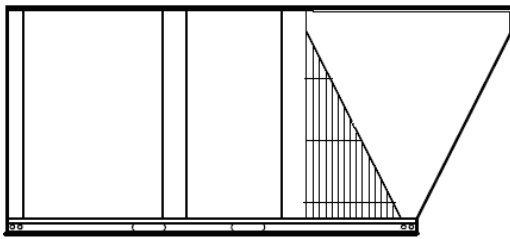
Standard bottom air supply & return

The air flow enters from the bottom return air inlet and supplies from bottom discharge air outlet after being conditioned within the unit. This kind of unit may select an Airflow installation base that lay above the premade discharge/return air opening of the rooftop, and indoor air duct connects directly with the discharge air outlet/return air inlet, dispensing with connection of rooftop outdoor air

duct to the unit, this enables the unit installation more compact and simple.

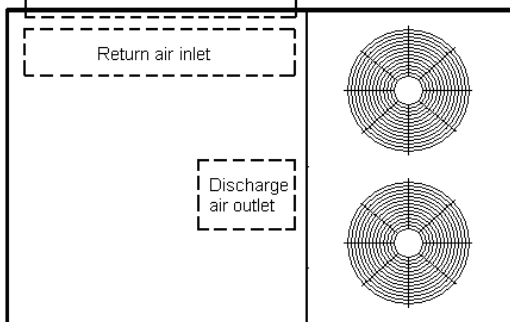
In the area of unit air return, it is optional to install dynamic discharge module and economizer, or install a return air fan to replace dynamic discharge module. Fresh/return air heat recovery is available for models ARTU140-ARTU420.

ARTU070-ARTU100 bottom return / supply



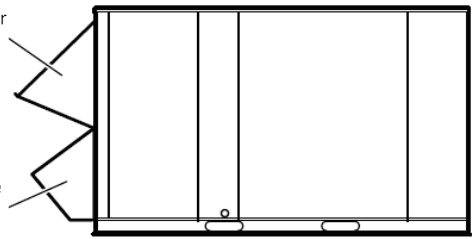
↑ Air return ↓ Air discharge

↑ Dynamic discharge ↑

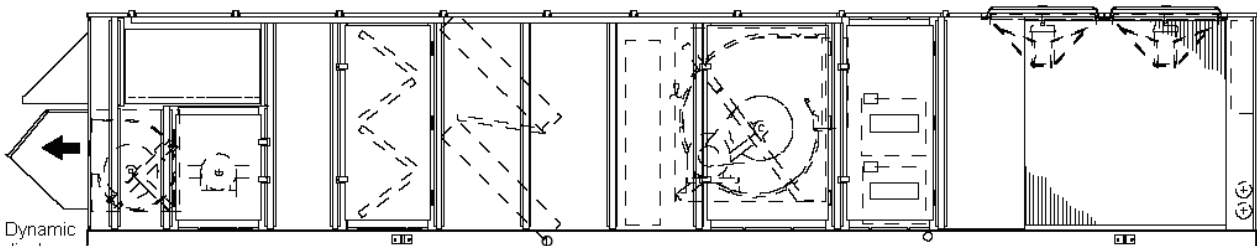


Outdoor fresh air or economizer shield (optional)

Dynamic discharge module shield (optional)



ARTU140-ARTU420 bottom return / supply



↑ Air return

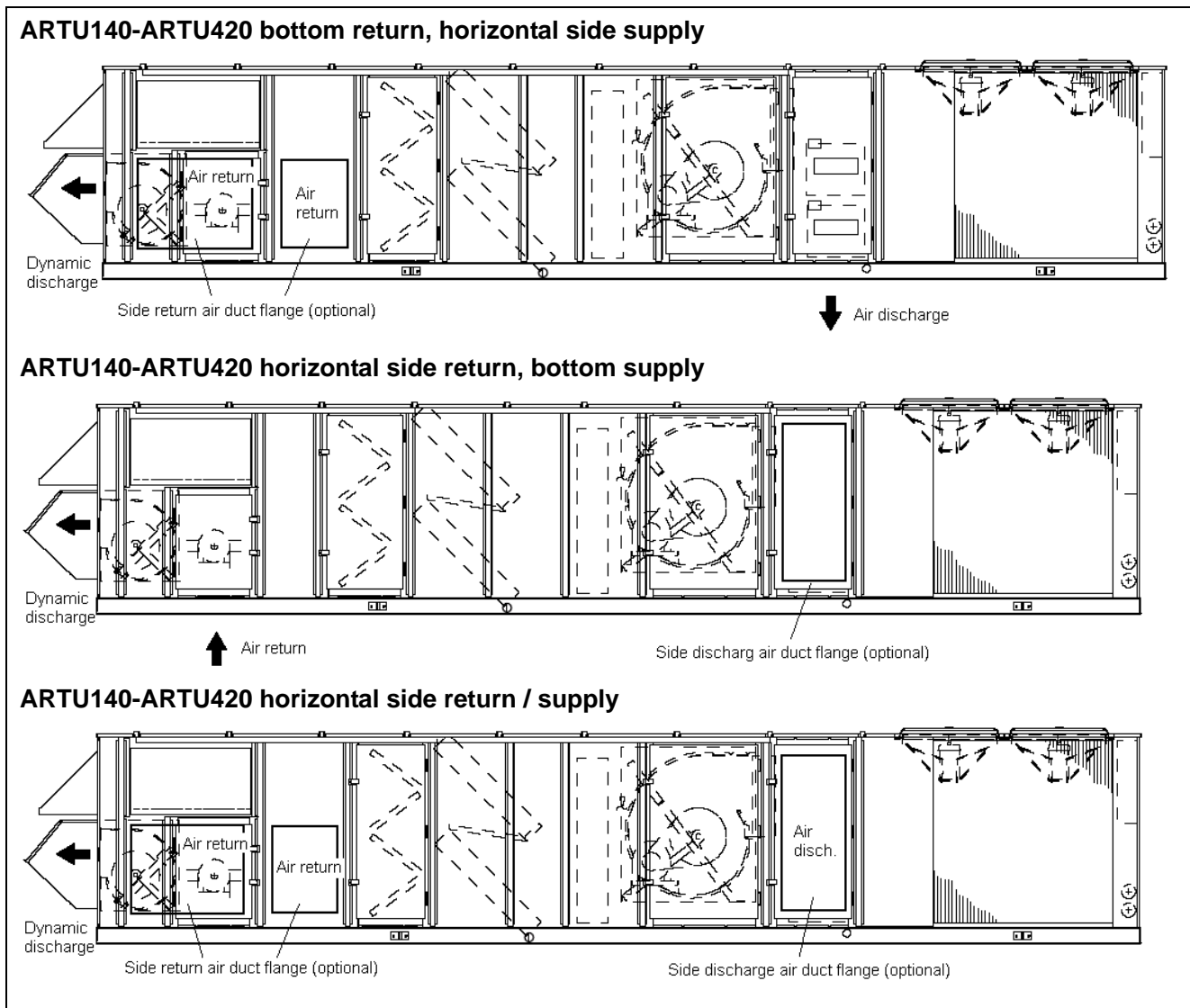
↓ Air discharge

Side air supply & return

Side air supply unit is to provide discharge air outlet in the side of unit discharge plenum and a flange to connect with discharge air duct, the air flow enters from return air inlet of unit bottom, or side, or rear, and discharges from unit side.

Side air return unit is to provide return air inlet in the side of unit and flange to connect with return air duct.

If models ARTU140-ARTU420 have an installed dynamic discharge module, fresh/return air heat recovery and economizer, it's necessary to add a 650mm long return air plenum, side return air inlet locates in return air plenum and dynamic discharge module separately, the air flow enters from unit side return air inlet and discharges from unit side or bottom discharge air outlet.





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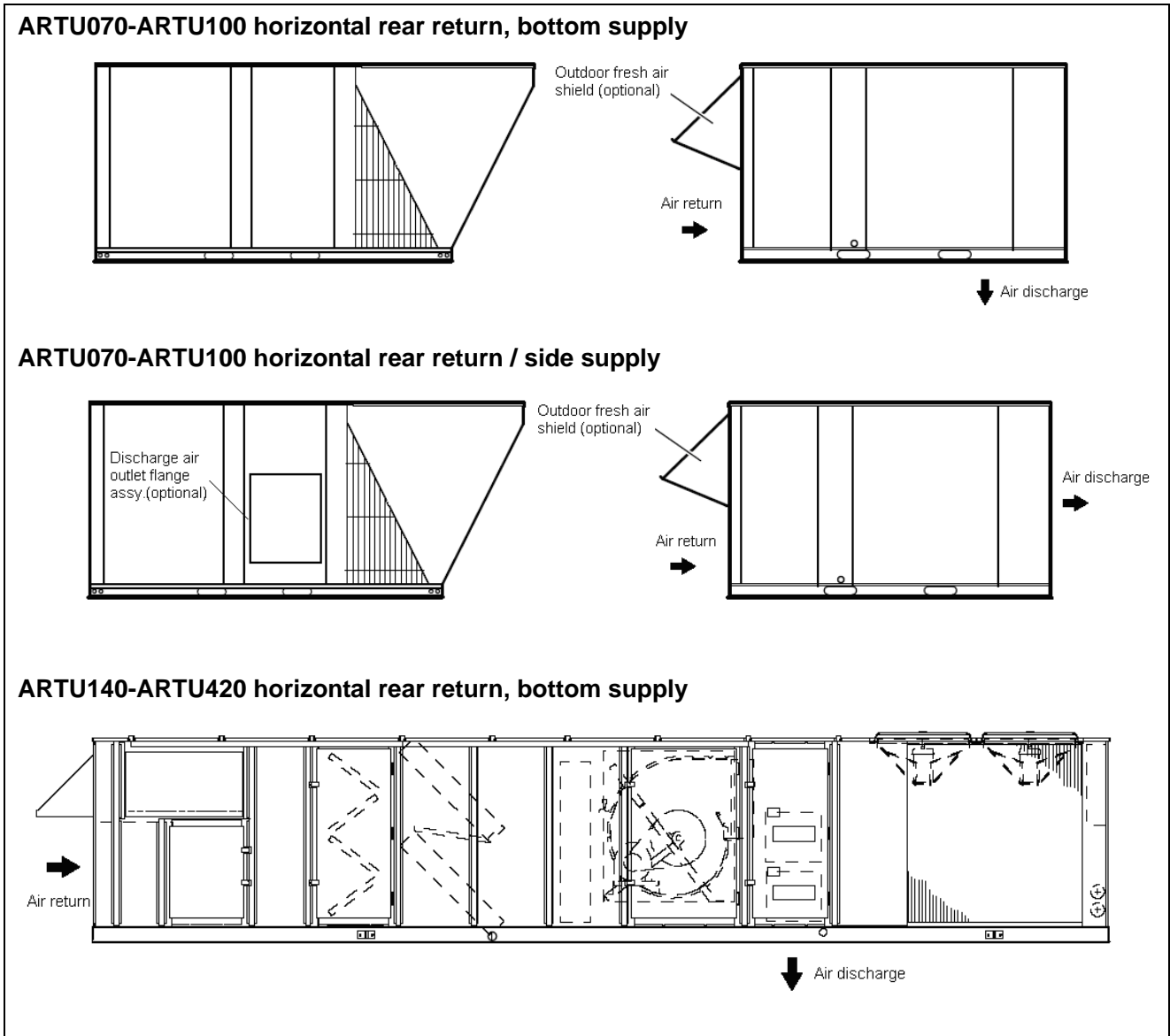
Installation (continued)

Rear air return

Return air orifice is provided in the rear of unit, and a flange is offered to connect with return air duct, the air flow enters from the rear of unit horizontally and discharges from unit bottom or side.

Dynamic discharge module is not available for models ARTU070-ARTU100 with rear air return.

In the area of unit return air for the ARTU140-ARTU420, it is optional to install a dynamic discharge module, fresh/return air heat recovery and economizer, or install a return air fan to replace dynamic discharge module.

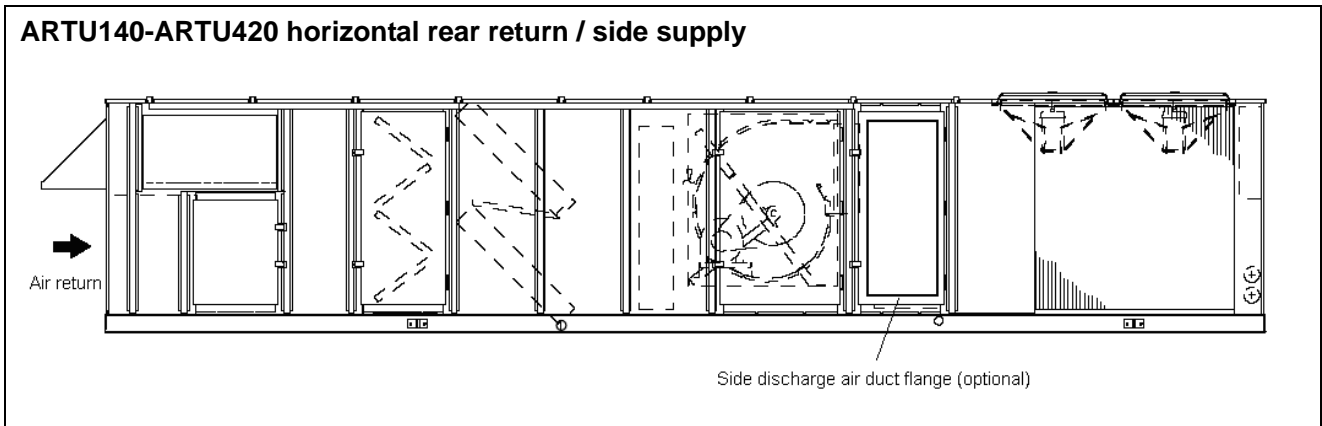




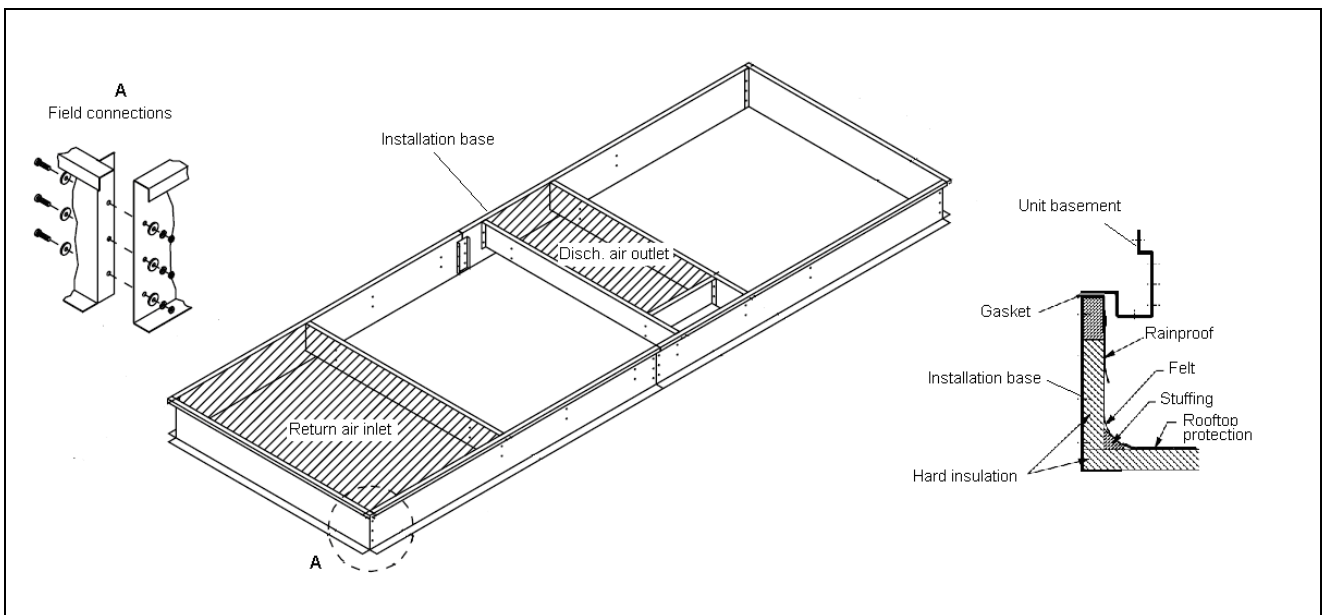
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Rear air return

ARTU140-ARTU420 horizontal rear return / side supply



Installation base for bottom supply & return units

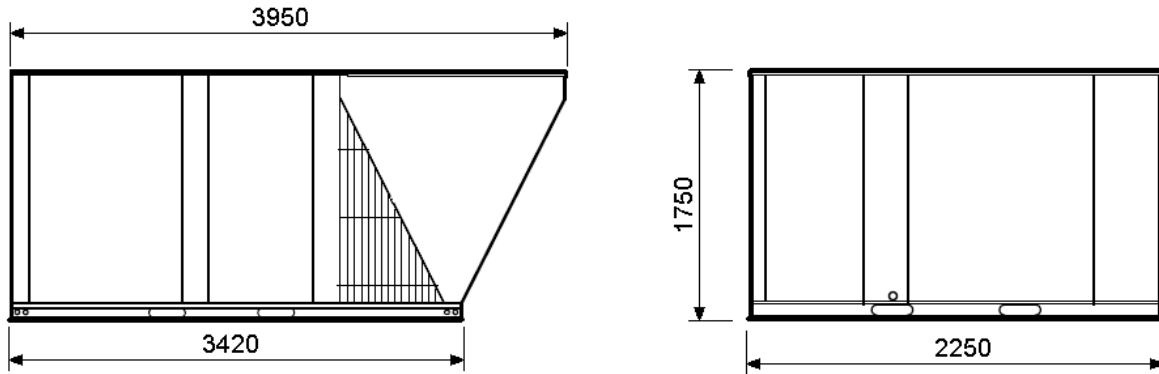




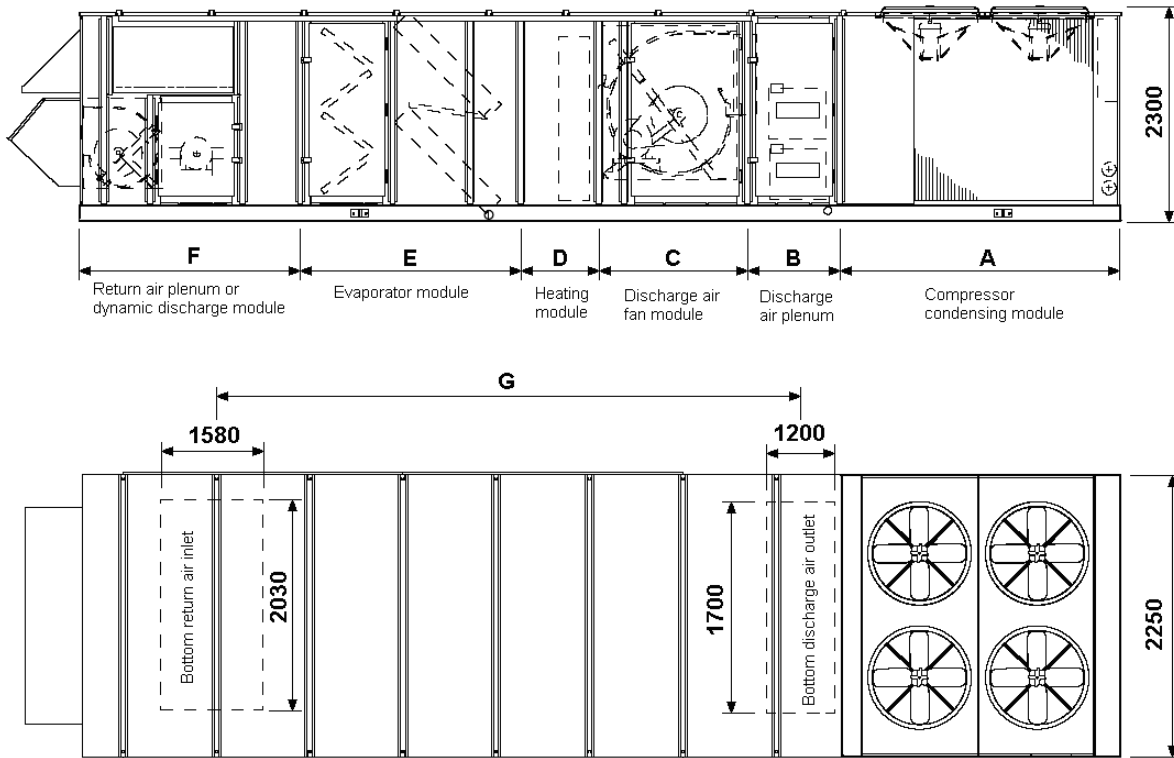
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Dimensions

ARTU070-ARTU100



ARTU140-ARTU420



Note: size G in the below table excludes the size of heating module

Model	A	B	C	D	E	F	G
ARTU140-ARTU205	2300	1450	2050	650	1650	2500	5675
ARTU240-ARTU275	2500	1450	2450	650	2000	2500	6425
ARTU350-ARTU420	3600	1450	2450	650	2000	1800	6425



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Model Selection

Fill in your requirements in the below table, Airflow will help you selecting appropriate model.

Customer name		Address								
Contact		Telephone				Facsimile				
E-mail						Date				
Basic performance	Model ARTU-		Unit type		<input type="checkbox"/> single cooling / <input type="checkbox"/> heat pump / <input type="checkbox"/> precision					
	Net cooling capacity		kw		Heat pump total capacity		kw			
	Ambient	Indoor °C				Outdoor °C				
		Cooling	DB		WB		Design °C		Range	
	Heat pump	DB		WB		Design °C		Range		
	Indoor blower	Nominal air flow	m ³ /h		Ex-static press.	Pa	Fan type	<input type="checkbox"/> constant / <input type="checkbox"/> variable		
		Air supply	<input type="checkbox"/> bottom downflow / <input type="checkbox"/> left side / <input type="checkbox"/> right side					Face to air flow direction within the unit to judge left and right		
Air return		<input type="checkbox"/> bottom lower / <input type="checkbox"/> left side / <input type="checkbox"/> right side / <input type="checkbox"/> rear								
Refrigerant		<input type="checkbox"/> R22 / <input type="checkbox"/> R134A / <input type="checkbox"/> R407C / <input type="checkbox"/> R410A				Power	V	Hz	Ph	
Optional functions	Air filter	Primary/middle	<input type="checkbox"/> paper filter / <input type="checkbox"/> Al. frame filter							
		Middle/high	Type		Clean grade		Efficiency	%		
	Return air fan	<input type="checkbox"/> constant frequency / <input type="checkbox"/> variable frequency								
	Dynamic disch. Module	Nominal air flow	m ³ /h	Ex-static press.	Pa	Fan type	<input type="checkbox"/> constant / <input type="checkbox"/> variable			
	Fresh/disch. heat recoverer	<input type="checkbox"/> total heat recovery / <input type="checkbox"/> sensible heat recovery								
	Economizer	<input type="checkbox"/> Yes / <input type="checkbox"/> No								
	Compressor discharge reheat system	<input type="checkbox"/> Yes / <input type="checkbox"/> No								
	Hot gas bypass capacity control	<input type="checkbox"/> Yes / <input type="checkbox"/> No								
	Condenser fan	<input type="checkbox"/> constant speed / <input type="checkbox"/> variable speed								
	Heater	Electrical	kw	Heating stage			Power	V	Hz	Ph
Hot water		kw	Hot water °C		In °C	Valve type		<input type="checkbox"/> 3-way / <input type="checkbox"/> 2-way		
					Out °C					
Steam		kw	Steam press.		kPa	Valve type		<input type="checkbox"/> 3-way / <input type="checkbox"/> 2-way		
	Steam flow		kg/h							
Other requirement										



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Since AIRFLOW has a policy of continuous product improvement, it reserves the right to change design and specifications without notice

ARTU Rev.1 11/09