



iVRF SYNERGY

Innovair VRF Full DC Inverter Technology (50/60 Hz)



R410A



- 1** Innovair Full DC Inverter Technology

- 2** High efficiency and more energy saving

- 3** Two-stage oil separation control technology

- 4** New convenient construction for intelligent debugging

- 5** Calculating cost of electricity / CAN2 Technology/Energy Recovery Vent (ERV)

- 6** Innovair Full DC Lineup and Combinations 50/60HZ

- 7** Innovair Full DC AHRI/UL lineup / Indoor Units lineup

- 8** Innovair Control system lineup

- 9** Modbus Gateway

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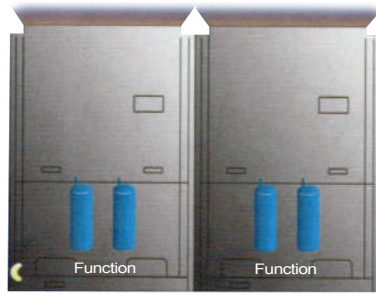


R410A

Innovair Full DC Inverter Technology

All DC HITACHI Inverter Compressors

- All DC scroll inverter compressors are used in these Innovair VRF units. It can directly control the intake gas to reduce overheat loss and improve the efficiency of the system.

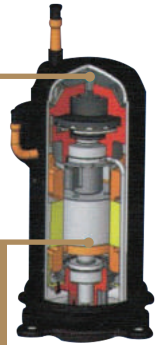


All DC Inverter Compressors

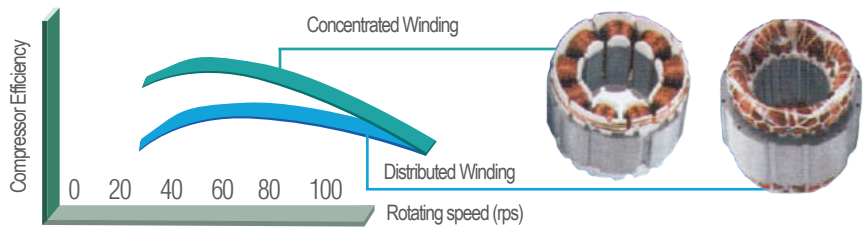


The High Pressure chamber structure improves the performance at high and middle frequency.

A New DC motor (concentrated winding) raises the low frequency performance.

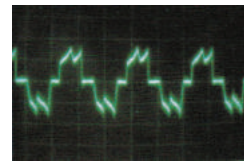
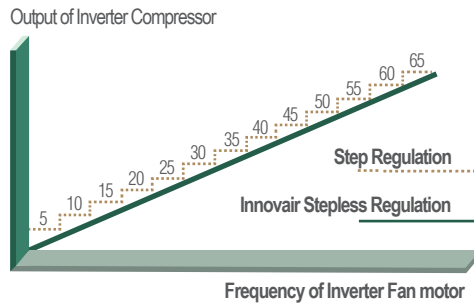


- High-efficiency permasyn (permanent magnets) motor is adopted to provide better performance than traditional DC inverter compressors.

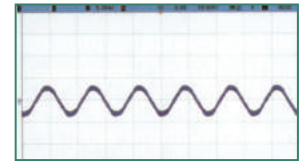


Sensorless DC Inverter Fan Motor

- Stepless speed regulation ranges from **5 Hz** to **65 Hz**. Compared with traditional inverter motors, the operation is more energy-saving.
- Sensorless control technology ensures lower noise, less vibration, and more stable operation.



Before



After

54 HP Max Capacity

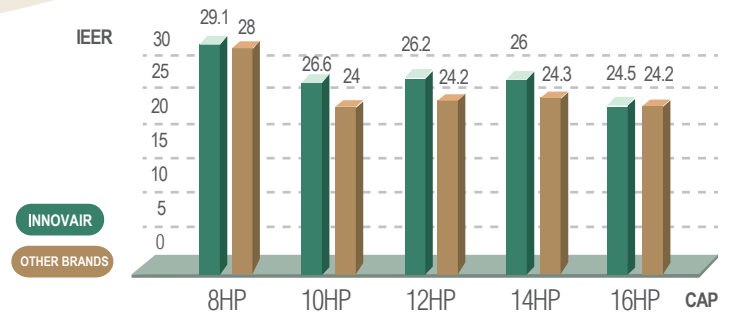
Max capacity of single outdoor unit reaches **16 HP** and max combination capacity up to **54 HP**.



High Efficiency and More Energy Saving

- Thanks to the advanced Full DC inverter technology, optimized system design and accurate intelligent control technology, IPLV of Innovair Full DC Inverter is up to 6.8

Note: Part load performance of commercial HVAC systems was represented as Integrated Part Load Performance (IPLV) which was used until January 1, 2010. Then a new methodology is adopted and defined as Integrated Energy Efficiency Ratio (IEER).
Source: ANSI/AHRI Standard 210/240.



New Generation of Energy-Saving Operation Technology with Energy Saving up to 20%

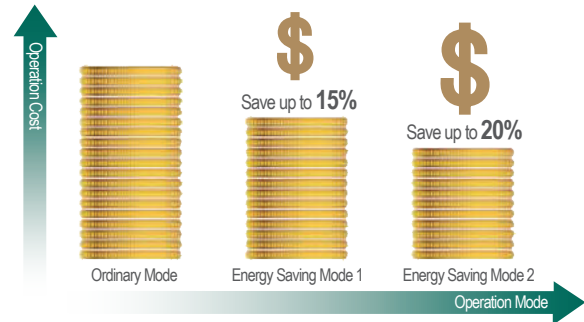
The New Innovair VRF Full DC system has 2 modes for energy saving, which can be chosen to meet different electricity demands.

Mode 1:

In auto energy-saving mode, the system will self-adjust parameters according to the operation status to lower the cost of electricity. Up to 15% of energy can be saved.

Mode 2:

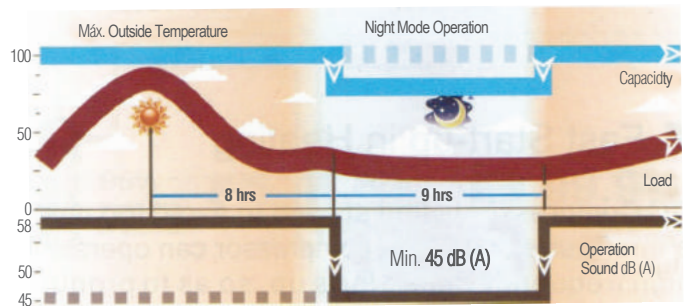
In compulsory energy-saving mode, the system will limit the power output forcibly. Up to 20% of energy can be saved.



Outdoor/Indoor Unit Quiet Mode and Quiet Control

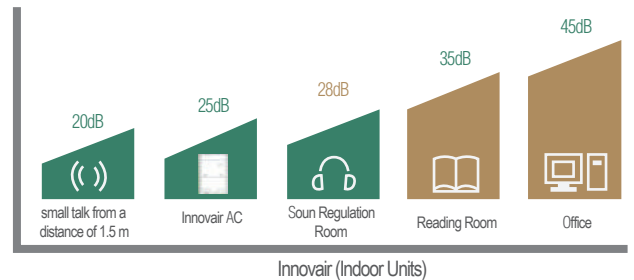
• Quiet Outdoor Unit at night

The system records the highest outdoor temperature. At night, the system will automatically turn to quiet mode. There are 9 quiet modes which can be set according to actual needs.



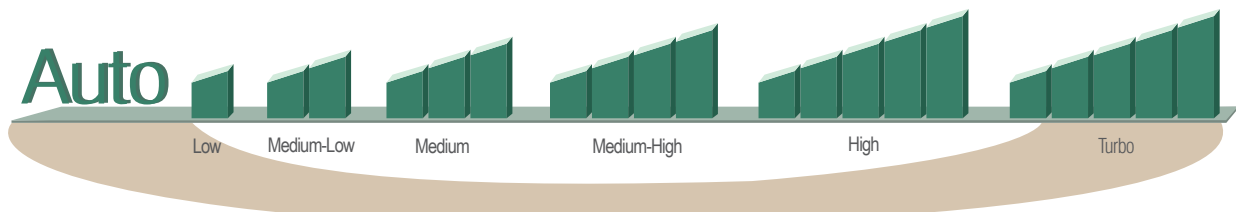
• Quiet Indoor Unit

The indoor units also adopt Full DC inverter motors for stepless regulation. According to indoor temperature or people's need, users can set this mode through wired controllers. Noise level is as low as 22 dB(A).



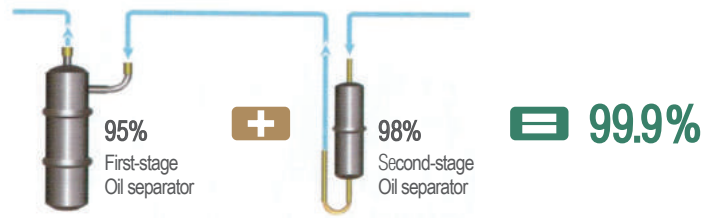
• 7 Speeds Indoor Fan

Indoor fan speed can be set in 7 levels by the wired controller. They are: auto, low speed, medium-low speed, medium speed, medium-high speed, high speed, and turbo positions. When the wired controller is ON, press "FAN" button to set indoor fan speed circularly as below.



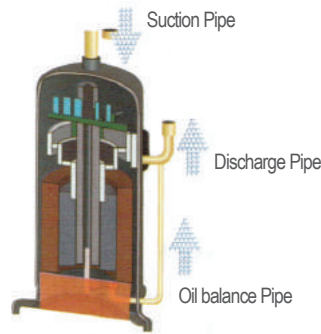
Two-stage Oil Separation Control technology (Patented)

First-stage oil separator adopts a filtration expansion valve with separation efficiency of 98%. Second-stage oil separator will separate the remained 2% refrigerant oil with separation efficiency of 95%. General oil separation efficiency reaches 99.9%.



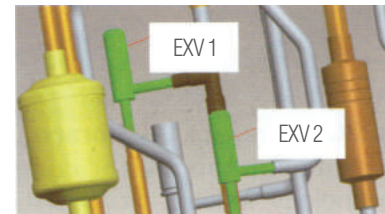
• Oil balance between each compressor

Refrigerant is taken into the compressor by the suction pipe and then runs through the cooling system. It can control the oil levels and minimum oil volume required by each compressor to assure the oil balance between each compressor.



• Multi Electronic Expansion Valves Control

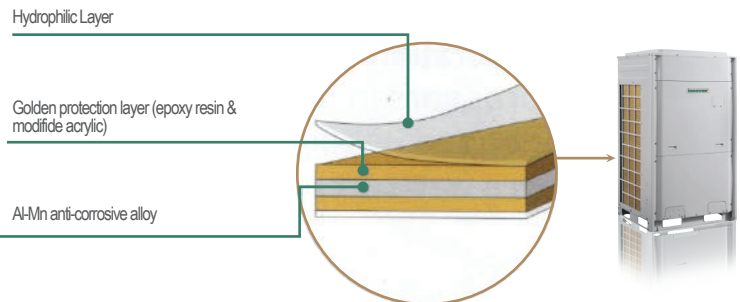
The Outdoor EXV not only has throttling effect but also controls the refrigerant flow. The system adopts multi valves control with 960 regulated grades by two EXV, so as to regulate refrigerant flow precisely and ensures a reliable an operation system.



Highly Antocorrosive Golden Fins

The primary material of Golden Fin is Al-Mn (Aluminium-Manganese) anti-rust alloy, which is coated with the Golden Protection Layer (components: epoxy resin & modified acrylic, silicon free), the anti-corrosive performance in salt-spray* testing is 200%-300% higher than normal Blue-Fin.

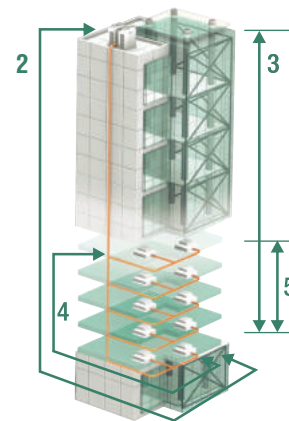
*Salt-spray testing result is from Innovair factory materials chemistry testing laboratory



• 1000 m Pipe Design for Flexible Installation

Innovair system can be applied in different types of building construction. One of its advantages is the simple pipe design, which will simplify the installation and reduce installation costs.

- Max total pipe length reaches 1000 m (with limitation).
- Actual pipe length between the outdoor unit and the farthest indoor unit: 165 m.
- Max height difference between indoor unit and outdoor unit: 90 m.



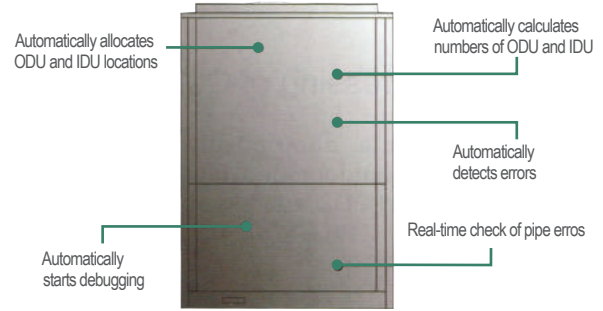
Innovair Full DC Inverter VRF System Piping Limitations - Maximum ft (m) (6)

INNOVAIR Model IOV Series Capacity Range (tons)	Unit Type	Max. Total Piping Length (1)	Farthest Indoor Piping Length (2)	Height difference between (I) Indoor & (O) Outdoor Units (3)		From 1st branch to the farthest Indoor Unit (4)	Height Difference between any 2 Indoor Units (5)
				(O) above (I)	(O) below (I)		
3.0 - 5.0	MINI	500 (150)	260 (80)	100 (30)	80 (25)	80 (25)	30 (10)
7.0 - 15.0	COMBO	1000 (300)	410 (125)	160 (50)	130 (40)	130 (40)	50 (15)
17.0 - 56	COMBO	3280 (1000) ¹	540 (165)	300 (90)	260 (80)	130 (40)	50 (15)

New convenient construction for intelligent debugging

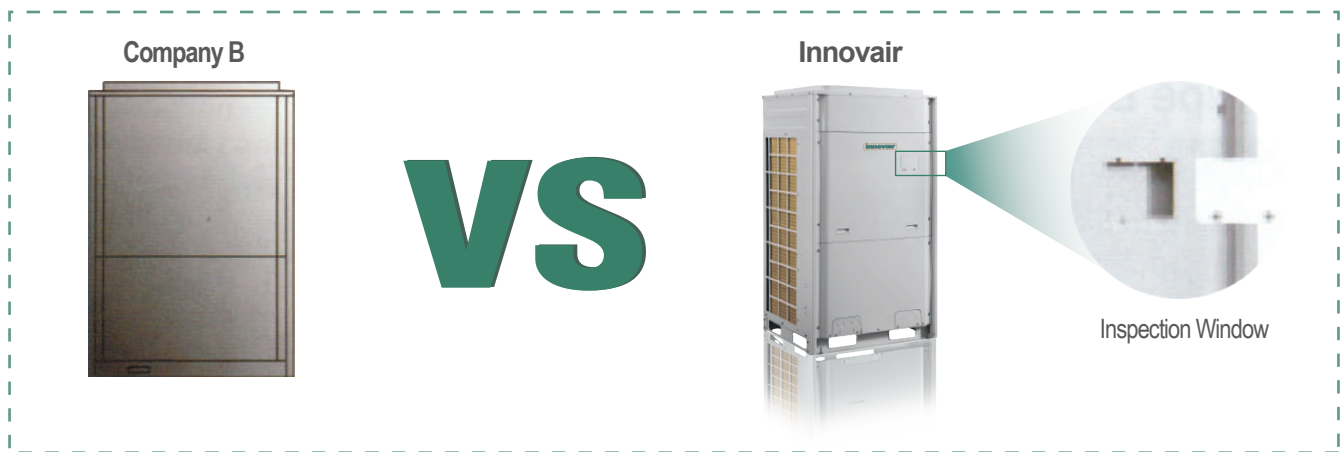
Innovair has five auto debugging features

- Automatic allocation of IDU and ODU addresses
- Automatic detection of IDU and ODU quantity
- Automatic detection of errors
- Automatic start-up of debugging
- Real-time judgment of pipe errors



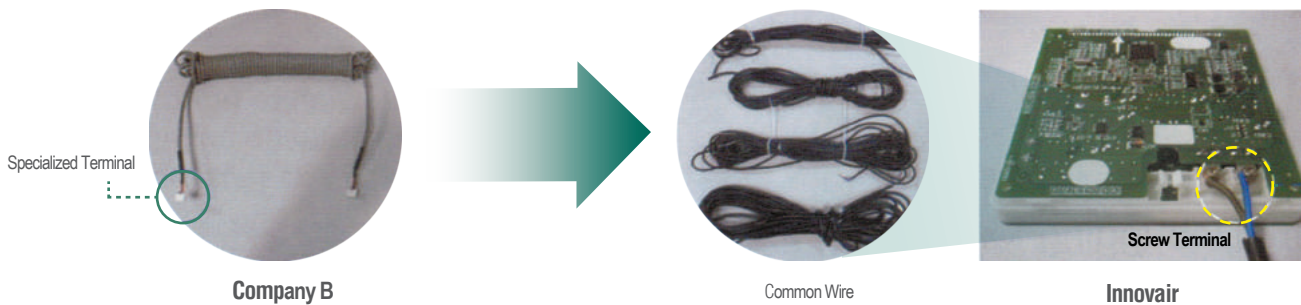
Inspection Window for convenient codes checking

Inspection window is available in this new model for quick checking of system operation status. No need to open panel for checking which will be more time-saving and easier maintenance.



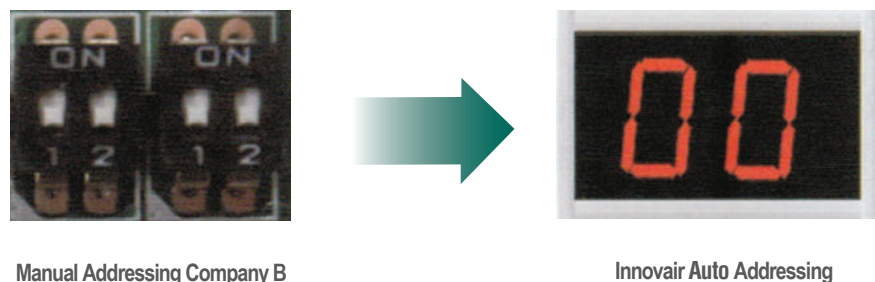
Flexible Wiring

Common wire can meet the communication demand with no need of specialized communication wire. Common sheath twisted pair cable can be used as there is no polarity requirement as in the previous model or any other brand.



Auto addressing of Outdoor and Indoor Unit

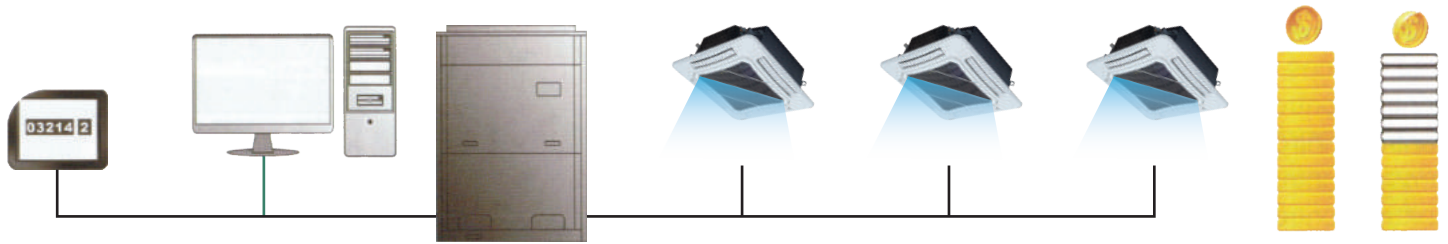
CAN network is adopted to achieve auto addressing of outdoor and indoor unit. It can allocate IDU and ODU addresses and detect IDU and OU quantity, which greatly improves construction efficiency.



Calculating Cost of Electricity

Auto calculation according to users

- According to the operation time, modes, flow of refrigerant, humidity, and other factors system can calculate the cost of electricity for users in different locations.
- Detailed information of bills and operation can be provided.



New CAN2 technology (no polarity) improves the communication efficiency














Innovair Energy Recovery Ventilator (IRV)



- Internal heat exchanger with double-way ventilator performs cooling and heating air exchange between returned and intake fresh air
- Unique by-pass mode can reduce consumption of fan motor
- Wide air flow range from 200 cfm (350 m³/h) to 1800 cfm (3000 m³/h) models
- Energy Saving Mode and Centralized Controller with a 24 h timer
- Internal filter keeps fresh air clean and dust free which effectively prevent pollution to fresh air
- Compact and low-noise design (IECEE CB certification only)
- No cross contamination
- Pretreatment of Fresh Air as it's humidified and preheated saving energy and load of the unit is reduced.

Model	IRV020	IRV030	IRV050	IRV60	IRV90	IRV120	IRV180
Airflow cfm (m ³ /h)	200 (350)	294 (500)	471 (800)	589 (1000)	883 (1500)	1177 (2000)	1766 (3000)
Ext Static Pressure in H ₂ O (Pa)	0.4 (100)	0.4 (100)	0.44 (110)	0.44 (110)	0.6 (150)	150	220
Temperature Exchange Efficiency (%)	71	68	70.0	75	73	71	70
Enthalpy Exchange Efficiency (%) Heating/Cooling	65/61	62/57	63/60	66/62	65/60	65/60	62/58
Power Supply (V/Ph/Hz)	220/1/60			220/3/60			
Power Input (KW)	0.17	0.26	0.50	0.50	1.10	0.80	0.95
Sound Pressure Level dB (A)	37	39	50	46	60	48	50
Outline (Package) Dimensions W x D x H (mm)	800x879x306 (1050x1165x315)		832x1016x380 (1087x1320x400)		1210x1215x452 (1540x1550x470)		1340x1550x572 (1610x1710x700)
Gross Weight Lb (Kg)	99 (45)	99 (45)	126 (57)	126 (57)	243 (110)	243 (110)	474 (215)

INNOVAIR FULL DC VRF COMBO OUTDOOR COMBINATIONS 50/60Hz


ODU MODEL	MODEL N ^o	HP (KW/KBTUh)	Recommended Combinations of Standard Models					Max. Qty. IDU
			IOV07	IOV09	IOV10	IOV12	IOV14	
	IOV07H3CDC713	08 (22.4/76.4)	●					13
	IOV09H3CDC716	10 (28.0/95.5)		●				16
	IOV10H3CDC719	12 (33.5/114.3)			●			19
	IOV12H3CDC723	14 (40.0/136.5)				●		23
	IOV14H3CDC726	16 (45.0/153.5)					●	26
	IOV16H3CDC729	18 (50.4/172.0)	●	●				29
	IOV18H3CDC733	20 (56.0/191.0)		●●				33
	IOV19H3CDC736	22 (61.5/210.0)		●	●			36
	IOV21H3CDC739	24 (68.0/232.0)		●		●		39
	IOV22H3CDC743	26 (73.0/249.0)		●			●	43
	IOV24H3CDC746	28 (78.5/268.0)			●		●	46
	IOV25H3CDC750	30 (85.0/290.0)				●	●	50
	IOV26H3CDC753	32 (90.0/307.0)					●●	53
	IOV28H3CDC756	34 (96.0/328.0)		●●		●		56
	IOV30H3CDC759	36 (101.0/345.0)		●●			●	59
	IOV32H3CDC763	38 (106.5/363.4)		●	●		●	63
	IOV33H3CDC764	40 (113.0/386.0)		●		●	●	64
	IOV35H3CDC764	42 (118.0/402.6)		●			●●	64
	IOV37H3CDC764	44 (123.5/421.4)			●		●●	64
	IOV38H3CDC764	46 (130.0/444.0)				●	●●	64
	IOV40H3CDC764	48 (135.0/461.0)					●●●	64
	IOV42H3CDC766	50 (141.0/481.0)		●●		●	●	66
	IOV45H3CDC769	52 (146.0/498.2)		●●			●●	69
	IOV46H3CDC771	54 (151.5/517.0)		●	●		●●	71
	IOV47H3CDC774	56 (158.0/539.0)		●		●	●●	74
	IOV49H3CDC777	58 (163.0/556.0)		●			●●●	77
	IOV51H3CDC780	60 (168.5/575.0)			●		●●●	80
	IOV52H3CDC780	62 (175.0/597.0)				●	●●●	80
	IOV54H3CDC780	64 (180.0/614.0)					●●●●	80

NOTES:

- Indoor units are selected within listed limits of quantities and capacities. Total of Indoor Units nominal capacities should not be less than the minimum or more than maximum limits specified.
- Power input represents the Kw consumption when operating at nominal conditions with 100% indoor unit loading.
- Mini VRF models must be installed stand alone and could not be combined and installed for single pipe with multiple quantity outdoors.
- Combo VRF models could be combined with limitations listed in the combination table.
- Listed models of Mini VRF are for 60 Hz application only. Other models for 220-240V/1Ph/50Hz, 380-415V/3Ph/50Hz, 440-460V/3Ph/60Hz, AHRI, and ETL certification units are also available. Please contact INNOVAIR for Technical Data and other details.
- Maximum 4 outdoor units could be connected for single pipe installation.
- Diversity factor: indoor units could be selected for a total capacity between 50% and 135% of the outdoor units combination listed above within the limits of maximum number of indoor units allowed.














INNOVAIR FULL DC VRF COMBO OUTDOOR COMBINATIONS 60Hz

ODU MODEL	MODEL N°	BTU/h (IEER)	IOV072	IOV096	IOV120	Max. Qty. IDU
	IOV072H3CDC712	69,000 (28.1)	●			12
	IOV096H3CDC716	92,000 (26.6)		●		16
	IOV120H3CDC720	114,000 (25.2)			●	20




Specifications of Indoor Units

Innovair VRF Full DC Specifications of Indoor Units (50/60Hz)

Type of Indoor Unit	MODEL	CAPACITY (KBTU/h)	008	010	013	018	020	025	032	040	044	048	060	080	100	150
High Static Pressure Duct Type	IAV—H7A7													●	●	
High Static Pressure Duct Type	ITV—H7A7											●	●			
Low Static Pressure Slim Duct Type	ITV-H7L7				●		●									
Low Static Pressure Duct Type	ITV-H7B7							●	●	●						
4-Way Cassette	ICV-H7S7							●	●	●		●	●			
Compact 4-Way Cassette	ICV-H7M7				●	●										
1-Way Cassette	ICV-H7O7				●	●										
Wall-mounted Type	IWV-H2N7		●	●	●	●	●	●								
Floor Ceiling Type	IUV-H7N7			●		●	●	●	●	●		●	●			
Fresh Air Processing Type	IFV-H2N7											●		●	●	●
Air Handler	IDV-H2N7							●	●			●	●			

Control System Lineup

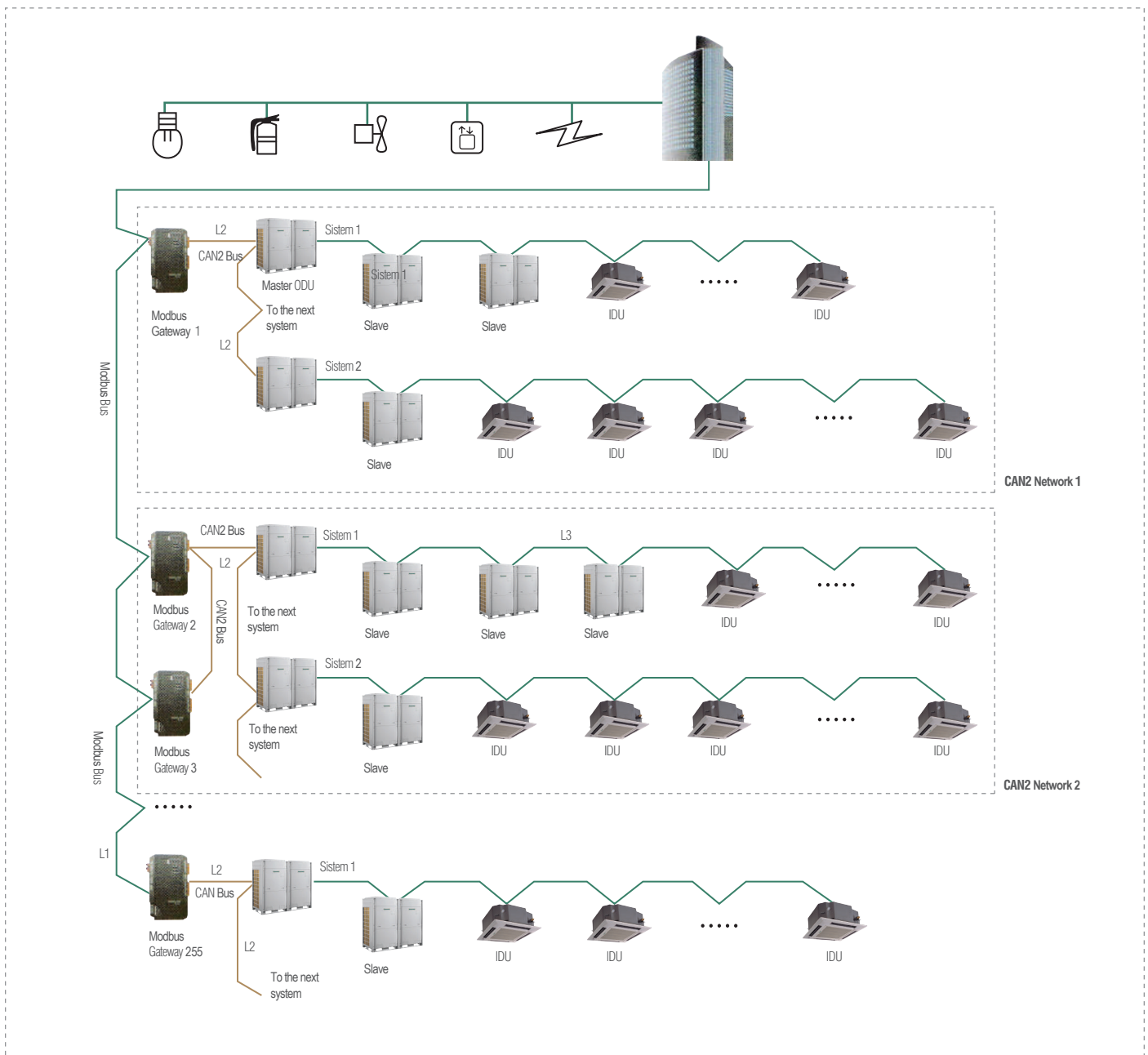
Controlling System		Product Series	Cassette	Ducted Type	Fresh Air Unit	Wall Mounted	Floor Ceiling	Console Type	Floor Standing	Air Handler
Wireless Controller		IFRC1107 	●	○	○	●	●	●	●	○
		IFRC1207 	○	○	○	○	○	○	○	○
Wireless Controller		IFWC1107 	○	●	●	○	○	○	○	●
		IFWC1207 	○	○	○	○	○	○	○	○
		IFWC1307 	○	○	○	○	○	○	○	○
Centralized Controller		CCON1007 	○	○	○	○	○	○	○	○
Smart Zone Controller		IFCC9007 	○	○	○	○	○	○	○	○
Remote Control Management		RMOS1007 	○	○	○	○	○	○	○	○
BMS Accessories	Communication Module (MODBUS)	ME30-24/E4(M) 	○	○	○	○	○	○	○	○
	BACnet	MG30-24/D2(B) 	○	○	○	○	○	○	○	○
Other Modules	Optoelectronic isolated converter	RS232-RS422/485 	○	○	○	○	○	○	○	○
	Optoelectronic isolated signal multiplier	RS-422/485 	○	○	○	○	○	○	○	○

Note: ● Standard ○ Optional

Modbus Gateway

Monitor the Innovair VRF system from BMS:

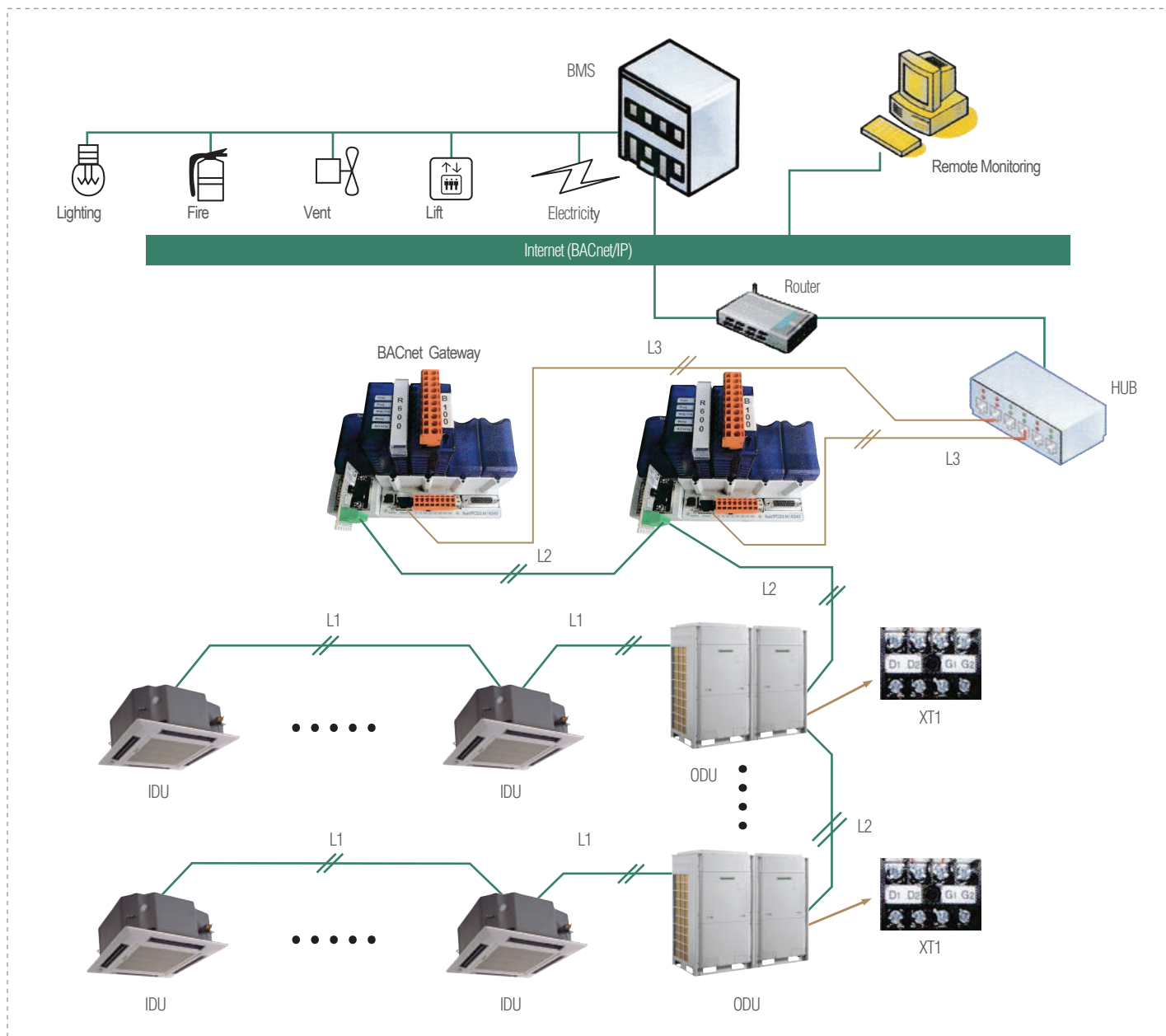
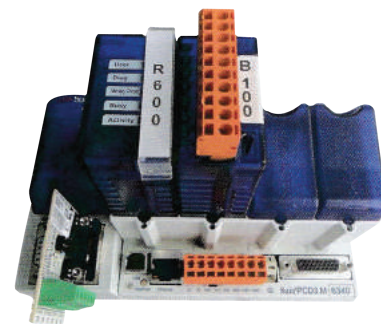
Modbus Gateway provides Innovair system with the Modbus communication protocol interface when connecting to the BMS (Building Management System) network in order to achieve central control and remote control over Innovair VRF system by BMS.



- Real time monitoring of unit operation status.
- Real time response to the control of unit by monitoring software.
- Control all the unit switches ON-OFF
- Monitor Error Codes.
- One Modbus protocol bus can support up to 255 gateways.
- One Modbus Gateway can support at most 16 outdoor units, up to 64 modular outdoor units, and 128 indoor units.
- Lock/Unlock units status.
- Linkage control supporting 5 DI and 5 DO for receiving fire alarm signal and user's definition logic.
- Non-polar CAN-RS485 communication ports.
- 100-240 VAV, 50/60Hz wide voltage range, adapted to the
- One Modbus Gateway can support at most 16 outdoor units, up to 64 power supply of each country region.

BACnet Gateway

The Innovair interface for use in BACnet (Building Automation and Control Networks) is intended to allow the data exchange between the Innovair VRF system and the BMS (Building Management System). The BACnet Gateway can be directly connected to the network via a general Ethernet hub providing the standard communication protocol BACnet/IP building interface with 8 I/O interfaces, one of them is for the fire detection system application. The status of the other 7 I/O interfaces is mapped to the specific objects/services of the BACnet/IP bus and can be defined by the user. The Innovair interface uses the services defined by the BACnet to return the status of the IDUs connected to the VRF network as well as to send configuration commands to them in response to requests from a BMS.



- International standard BACnet/IP interface which has passed BTL certification.
- Real-time monitoring of unit operation status: ON-OFF, mode, temperature, etc.
- Real-time response to the control of unit (ON-OFF, mode setting and speed setting, etc.) by monitoring software.
- Monitor unit errors.
- Lock unit operation status, directing at all control functions of unit itself or a certain setting function.
- Achieve cooling and heating temperature limitation functions. 8 DI/DO interfaces for receiving fire alarm signal and user's definition logic.
- Big storage capacity of unit operation data for 6 months.

Specifications of Outdoor Units



380-415V,50/60Hz

Model		-	IOV07H7CDC713	IOV09H7CDC716	IOV10H7CDC719	IOV12H7CDC723	IOV14H7CDC726
Capacity Range		HP	8	10	12	14	16
Capacity	Cooling	kW	22.4	28	33.5	40	45
	Heating	kW	25	31.5	37.5	45	50
EER		kW/kW	4.31	4	3.98	3.76	3.56
COP		kW/kW	4.55	4.32	4.17	4.05	3.85
Max. Circuit/Fuse Current		A	15.7/20	20.9/25	24.7/32	28.8/40	33.2/40
Power Consumption	Cooling	kW	5.2	7	8.41	10.65	12.65
	Heating	kW	5.5	7.3	9	11.1	13
Max. drive IDU No		unit	13	16	19	23	26
Refrigerant Charge Volume		kg	5.9	6.7	8.2	9.8	10.3
Sound Pressure Volume		dB(A)	60	61	63	63	63
Connecting pipe	Liquid	mm	Ø 9.52		Ø 12.7		
	Gas	mm	Ø 19.05	Ø 22.2	Ø 25.4		Ø 28.6
Dimension (W*D*H)	Outline	mm	930*765*1605		1340*765*1605		
	Package	mm	1010*840*1775		1420*840*1775		
Net Weight/Gross Weight		kg	225/235		285/300	360/375	

208-230V,60Hz

Model		-	IOV07H3CDC713	IOV09H3CDC716	IOV10H83DC719	IOV12H3CDC723	IOV14H3CDC726
Capacity Range		HP	8	10	12	14	16
Capacity	Cooling	kW	22.4	28	33.5	40	45
	Heating	kW	25	31.5	37.5	45	50
EER		kW/kW	4.31	4	3.98	3.76	3.56
COP		kW/kW	4.55	4.32	4.17	4.05	3.85
MCA		A	36	38	43	60	65
MOP		A	60	60	60	80	90
Power Consumption	Cooling	kW	5.2	7	8.41	10.65	12.65
	Heating	kW	5.5	7.3	9.0	11.1	13
Max. drive IDU No		unit	13	16	19	23	26
Refrigerant Charge Volume		kg	5.9	6.7	8.2	9.8	10.3
Sound Pressure Volume		dB(A)	60	61	63	63	63
Connecting pipe	Liquid	mm	Ø 9.52		Ø 12.7		
	Gas	mm	Ø 19.05	Ø 22.2	Ø 25.4		Ø 28.6
Dimension (W*D*H)	Outline	mm	930*765*1605		1340*765*1605		
	Package	mm	1010*840*1775		1420*840*1775		
Net Weight/Gross Weight		kg	225/235		285/300	360/375	

440-460V,60Hz

Model		-	IOV07H9CDC713	IOV09H9CDC716	IOV10H9CDC719	IOV12H9CDC723	IOV14H9CDC726
Capacity Range		HP	8	10	12	14	16
Capacity	Cooling	kW	22.4	28	33.5	40	45
	Heating	kW	25	31.5	37.5	45	50
EER		kW/kW	4.15	3.84	3.85	3.69	3.49
COP		kW/kW	4.31	4.12	4.01	3.93	3.76
MCA		A	19	20	24	32	35
MOP		A	30	30	35	40	40
Power Consumption	Cooling	kW	5.4	7.3	8.7	10.85	12.9
	Heating	kW	5.8	7.65	9.35	11.45	13.3
Max. drive IDU No		unit	13	16	19	23	26
Refrigerant Charge Volume		kg	6.5	6.7	8.2	9.8	10.3
Sound Pressure Volume		dB(A)	60	61	63	63	63
Connecting pipe	Liquid	mm	Ø 9.52		Ø 12.7		
	Gas	mm	Ø 19.05	Ø 22.2	Ø 25.4		Ø 28.6
Dimension (W*D*H)	Outline	mm	930*765*1605		1340*765*1605		
	Package	mm	1010*840*1775		1420*840*1775		
Net Weight/Gross Weight		kg	225/235		285/300	360/375	



Lined area for handwritten notes, consisting of 18 horizontal light purple lines.



Lined area for handwritten notes, consisting of 23 horizontal light purple lines.

