POLAR AIR

INSTALLATION, OPERATION & SERVICE MANUAL

COANDA EFFECT CASSETTE CHV2

POLAR Global
HVAC SYSTEMS

YOUR SATISFACTION, OUR OBJECTIVE

INVESTING IN QUALITY, RELIABILITY & PERFORMANCE

ISO 9001 QUALITY

Management Service

Every product is manufactured to meet the stringent requirements of the internationally recognized ISO 9001 standard for quality assurance in design, development and production.

CE SAFETY STANDARDS

Product Service

All products conform to the Certificate Europe directives (Machinery Safety, Electromagnetic Compatibility and Low Voltage), as required throughout the European Community, to guarantee correct standards of safety.

WEEE MARK

All products conform to the "**WEEE**" directive to guarantee correct standards of environmental solutions.

World Leading Design and Technology

Equipped with the latest air-conditioning test rooms and manufacturing technology, we produce over 50,000 fan coil units each year, all conforming to the highest international standards of quality and safety.

The Highest Standards of Manufacturing

In order to guarantee the very highest standards and performance, we manage every stage in the manufacturing of our products. Throughout the production process we maintain strict control, starting with our extensive resources in research and development through to the design and manufacture of almost every individual component, from molded plastics to the assembly of units and controllers.

Quality Controlled from Start to Finish

Our highly trained staff and strict quality control methods enable us to produce products with an exceptional reputation for reliability and efficiency, maintained over many years. As well as CE certification and ISO 9001, several products ranges have UL / ETL safety approval in the USA and Canada, Eurovent performance and sound certification as well as ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting fan coil units.

ALWAYS MAKE SURE THIS MANUAL REMAINS WITH THE UNIT. READ THIS MANUAL BEFORE PERFORMING ANY OPERATION ON THE UNIT.

Table of Contents

A. Technical Data 5
A.1. General Description 5
A.2. General Specifications 6
A.2.1. 2-Pipe Systems 6
A.2.2. 4-Pipe Systems 7
A.3. Coil Data 8
A.4. Dimensional Drawings 9
A.5. Sound power data 10
B. Installation 11
B.1. Safety Precautions 11
B.2. Before Installation 12
B.3. Installation Location 13
B.4. Installation and False Ceiling Clearance 13
B.5. Pipe Works 14
B.6. Condensate Drainage Connection 14
B.7. External Drain Pan Installation 15
B.8. Valve Installation 16
B.9. Fresh Air and Branch Duct Connection 17
B.10. Suspension Bolts Layout and Ceiling Opening 19
B.11. Suspension Installation 21
B.12. Interconnecting Wiring 22
C. Maintenance 23
C.1. For Units Out Of Use for an Extended Period 23
C.2. Extra Maintenance 23
C.3. Air Vent and Water Purge Valve 23
C.4. Filter Removal and Cleaning 24
C.5. Control Box Replacement 24
C.6. Condensate Drain Pump and Float Switch Replacement 25
C.7. Fan Deck or Coil Assembly Replacement 26
C.8. Motor and Fan Blower Replacement 27
C.9. Electric Heater Replacement 27
C.10. Fan Speed Customization 28
D. Control Specifications: Intelligent Control (I Type) 29
D.1. I/O Port Definitions 29
D.2. Wiring Diagrams 30
Standard I Type Control PCB 30
D.3. Control Logic For 2-Pipe System 32
D.3.1. With Valve Configuration 32
D.3.2. With 6-way modulating Valve Configuration 35
D.4. Control Logic For 4-Pipe System 37
D.5. Sleep Mode 38
D.6. Auto Fan Speed 39
D.7. STEPPING MOTOR 39
D.8. Buzzer 39
D.9. Auto Restart 39
D.10. On/Off Switch On LED Display 39
D.11. Drain Pump 40
D.12. Float Switch 40
D.13. Electric Heater Safety Switch 40
D.14. Low Temperature Protection of Indoor Coil in Winter 40
D.15. Open Modbus protocol 42
D.16. Network Setup 46
D.17. LED Display and Error Description 48
E. Control Specifications: Flexible Function (W Type) 49
E.1. Features 49
E.2. I/O Port Definitions 49
E.3. Wiring Diagrams 50
E.3.1. Flexible Function PCB - W Type Control 50

E.4. Control Logic Specifications....51
E.4.1. Unit Power ON/OFF....51
E.4.2. Alarm Protection and Error Display....51
E.4.3. Drain Pump Operation....51
E.4.4. Low Temperature Protection of Indoor Coil in Winter....51
E.5. LED Display and Error Description....52
F. User Interface....53
F.1. Remote Handset....53
F.2. Wired Wall Pad Controller....54
F.2.1. LED display....54
F.2.2. Dimensions....55
F.2.3. Buttons and function....55
F.2.4. Error code....59
G. Sensor Resistance R-T Conversion Table....60
H. Troubleshooting....61

Model Code Nomenclature

1	2	3	4	5
CHV2	-01	-V	-I	-AC

Notation		Description
1	**CHV2**	Coanda Effect Hydronic Series
2	**01**	Unit Size (See General Specification Section A for cooling and heating capacities.)
3	**V**	V – 2-pipe P – 4-pipe
4	**I**	Control type: I –Intelligent Control W – Flexible function Control
5	**AC**	AC Motor

A. Technical Data

A.1. General Description

CHV2 units generate an airflow with a “Coanda” effect due to particular air handling section. The unit is suitable for installation in a suspended ceiling. Air intake is from the bottom while the air supply is parallel to the ceiling through practical and functional intake and outlet grilles. The “Coanda” effect creates excellent circulation of air inside the room. A condensate pump is supplied as standard part.

Construction
Casings are constructed of galvanized sheet steel with integral fans mounted on rails for added strength. Fire resistant insulation is fitted internally and externally to provide both thermal and acoustic insulation.

Round diffuser
The unit is supplied with round diffusers suitably designed to generate an air flow with “Coanda” effect. The direction of diffuser air flow can be manually adjusted on site.

Chilled water coil
Constructed with seamless copper tubes and headers. The tubes are mechanically expanded into corrugated aluminum fin material for a permanent primary to secondary surface bond. Coils are tested at 35 bar and recommended for operation at 20 bar. Coils include manual air vent and water purge.

Fan
The backward-curved centrifugal fan is statically and dynamically balanced for quiet operation. Fan impellers are made from fire-retardant plastic for lightweight and corrosion-resistant operation.

AC motor
Standard motors are PSC, permanently lubricated type with internal thermal overload protection. The unit is using 5-speed AC motor which can be set on the site after removing front panel.

Condensate pump
A condensate pump is fitted to carry water out of the unit. The pump can be withdrawn from the side casing by removing screws. A float switch is fitted to stop the cooling action, should the pump become blocked or fail.

Fresh air
The fresh air system for cassette unit allows up to 15% of unit airflow (maximum air flow per connection is 100m^3/h) as fresh air intake (per connection). Maximum 2 fresh air connections per unit are allowed.

Filtration
The standard filter is easily removable, is washable and is made from self-extinguishing acrylic with an efficiency of class G2 (EU2).

Intelligent control (I type)
Intelligent control board is controlled via Infra-red handset and/or Intelligent wired wall pad, is field programmable and easy to be configured through the wired wall pad or open Modbus protocol with VWV and VAV control logics, provides variable speed indoor fan control, integrates with Intelligent modulating valves to allow Auto Dynamic Balancing and Intelligent Constant Delta T management systems. It controls 2-pipe, 2-pipe with electric heater, 2-pipe with 6-way valve and 4-pipe systems.

Electro-mechanical controls (W type)
A 230VAC signal from the thermostat which working power is from L and N or from indoor room to terminal H/M/L supplies power to the blower motor. When H (H/M/L) is powered ON, the stepping motor is working and open the louver at maximum position. When H (H/M/L) is powered OFF, the stepping motor will close the louver. The condensate pump will run continuously, as long as coil temperature is less than 15°C. Alarm notification and zone control function are available. 40VA 24VAC transformer is equipped with unit optionally, which is used to supply 24VAC power to thermostat and modulating valve.

A.2. General Specifications

A.2.1. 2-Pipe Systems

Product range: CHV2 Coanda Effect Hydronic 2-pipe Unit with AC motor

CHV2-[Size]-V~					01B	02	03
Unit Configuration	Configuration				2-pipe		
	Number Of Fan Blowers				Single	Twin	
	Power Supply			(V/Ph/Hz)	220-240 / 1 / 50-60		
Air	Total Air Flow		H	m^3/h	275	451	545
			M		219	346	413
			L		195	307	365
Cooling	Cooling Capacity[e]		H	kW	1.54	2.55	3.26
			M		1.29	2.06	2.6
			L		1.17	1.87	2.35
	Sensible Cooling Capacity[e]		H		1.1	1.82	2.29
			M		0.92	1.46	1.82
			L		0.83	1.32	1.64
	Latent Cooling Capacity		H		0.44	0.73	0.97
			M		0.37	0.6	0.78
			L		0.34	0.55	0.71
	FCEER[e]	Rating			47.61	52.22	56.34
		Class			E	E	D
Heating	Heating Capacity[e]		H	kW	1.57	2.58	3.23
			M		1.3	2.07	2.56
			L		1.18	1.88	2.31
	Max. Electric Heater Capacity				0.75	1	1.5
	FCCOP[e]	Rating			61.6	59.02	62.62
		Class			E	E	E
Sound	Sound Pressure Level (Outlet)			dB(A)	42/36/33	45/36/33	42/36/32
	Sound Power Level (Outlet)[e]				53/45/42	56/51/48	57/54/46
Electrical	Power input in cooling mode[e]		H	W	36.8	56	62
			M		27.6	40	47
			L		24	35	41
	Power input in heating mode[e]		H	W	32.2	51	57
			M		23	36	42
			L		18	31	36.1
	Fan Motor Running Current @ H			A	0.16	0.22	0.22
	Fan Motor Starting Current @ H			A	0.48	0.66	0.67
Hydraulic	Cooling Water Flow Rate		H	L/h	267	432	555
			M		226	355	456
			L		204	325	413
	Cooling Pressure Drop[e]		H	kPa	12.2	13.2	25.5
			M		9	9.2	17.4
			L		7.56	7.81	14.5
	Heating Water Flow Rate		H	L/h	269	431	545
			M		226	353	444
			L		208	324	405
	Heating Pressure Drop[e]		H	kPa	10.4	11.2	21
			M		7.5	7.6	14.2
			L		6.4	6.4	11.7
	Water Content			L	0.2196	0.3485	0.4917
Construction and Packing Data	Water	Type			Socket (Threaded Female)		
	Connections	In		mm[in]	12.7 [1/2"]		
		Out					
	Condensate Drainage Connection				25.4 [1"]		
	Dimensions	L		mm	567	867	1167
		W			560	560	560
		H			265	265	265
	Panel Dimensions				595*595*12	895*595*12	1195*595*12
	Net Weight			Kg	21	31	37

"e": Above specifications are based on declared Eurovent test data for the year of publication of this document. To confirm the most updated specifications, please visit www.eurovent-certification.com.
Eurovent testing conditions:

a. Cooling mode (2-pipe):
- Return air temperature: 27C DB/ 19C WB.
- Inlet/ outlet water temperature: 7C/ 12C.

b. Heating mode (2-pipe):
- Return air temperature: 20C
- Inlet/ outlet water temperature: 45C/40C

A.2.2. 4-Pipe Systems

Product range: CHV2 Coanda Effect Hydronic 4-pipe Unit with 5 speed AC motor and 1 row Auxiliary Heating Coil

CHV2-[Size]-P~					01B	02	03
Unit Configuration	Configuration				4-pipe		
	Number Of Fan Blowers				Single	Twin	
	Power Supply			(V/Ph/Hz)	220-240 / 1 / 50-60		
Air	Total Air Flow	H		m^3/h	275	451	545
		M			219	346	413
		L			195	307	365
Cooling	Cooling Capacity[e]	H		kW	1.55	2.52	3.26
		M			1.32	2.07	2.6
		L			1.19	1.89	2.35
	Sensible Cooling Capacity[e]	H			1.1	1.8	2.29
		M			0.92	1.46	1.82
		L			0.83	1.33	1.64
	Latent Cooling Capacity	H			0.45	0.72	0.97
		M			0.4	0.61	0.78
		L			0.36	0.56	0.72
	FCEER[e]	Rating			48.24	52.61	56.34
		Class			E	E	D
Heating	Heating Capacity[e]	H		kW	1.31	2.21	2.61
		M			1.1	1.81	2.12
		L			1.01	1.67	1.93
	FCCOP[e]	Rating			52.51	53.21	52.18
		Class			E	E	E
Sound	Sound Power Level (Outlet)[e]				53/45/42	56/51/48	57/54/46
Electrical	Power input in cooling mode[e]	H		W	37	56	62
		M			28	40	47
		L			24	35	41
	Power input in heating mode[e]	H		W	32	51	57
		M			23	36	42
		L			18	30	36
Hydraulic	Cooling Water Flow Rate	H		L/h	267	432	555
		M			226	355	456
		L			204	325	413
	Cooling Pressure Drop[e]	H		kPa	11.6	15.1	25.5
		M			8.8	10.8	17.4
		L			7.4	9.3	14.5
	Heating Water Flow Rate	H		L/h	112	189	223
		M			95	155	181
		L			87	143	165
	Heating Pressure Drop[e]	H		kPa	4.7	16.4	20.7
		M			3.6	11.7	14.5
		L			3.1	10.2	12.4
	Chilled Water Content			L	0.219	0.348	0.492
	Hot Water Content				0.073	0.116	0.164
Construction and Packing Data	Water Connections	Type			Socket (Threaded Female)		
		In		mm[in]	12.7[1/2"]		
		out					
	Condensate Drainage Connection				25.4[1"]		
	Dimensions	L		mm	567	867	1167
		W			560	560	560
		H			265	265	265
	Panel Dimensions				595*595*12	895*595*12	1195*595*12
	Net Weight			kg	21	31	37

"e": Above specifications are based on declared Eurovent test data for the year of publication of this document. To confirm the most updated specifications, please visit www.eurovent-certification.com.

Eurovent testing conditions:

a. Cooling mode (4-pipe):
- Return air temperature: 27C DB/ 19C WB.
- Inlet/ outlet water temperature: 7C/ 12C.

b. Heating mode (4-pipe):
- Return air temperature: 20C
- Inlet/ outlet water temperature: 65C/55C

A.3. Coil Data

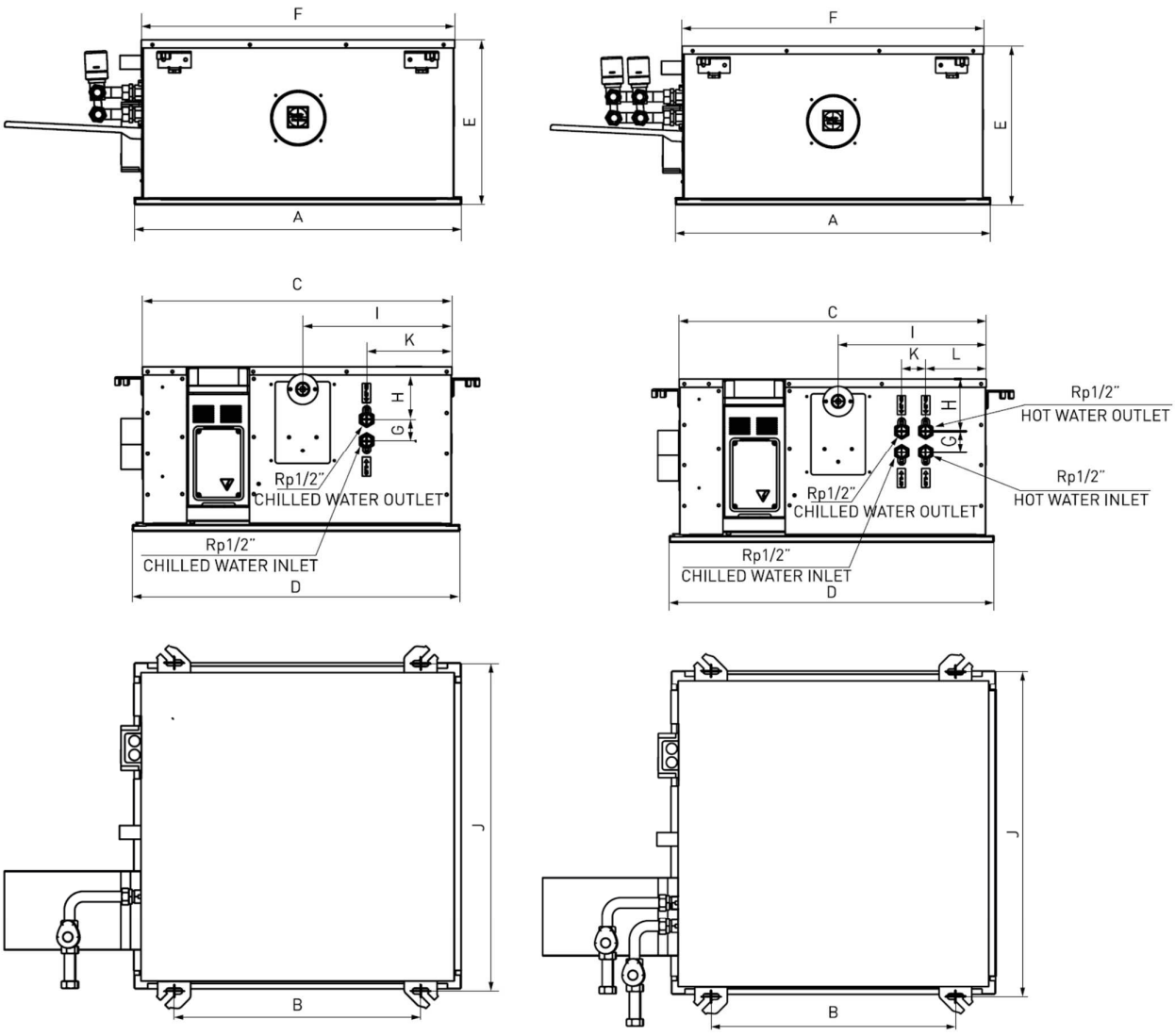
2-Pipe Systems

Model	Fin Height (mm)	Fin Length (mm)	Fins / inch	No. of rows	No. of circuits	Tube Diameter (inch)
CHV2-01-V	200	458	13	3	2	3 / 8”
CHV2-02-V	200	758	13	3	3	3 / 8”
CHV2-03-V	200	1058	13	3	3	3 / 8”

4-Pipe Systems – Auxiliary Heating Coil (1-row)

Model	Fin Height (mm)	Fin Length (mm)	Fins / inch	No. of rows	No. of circuits	Tube Diameter (inch)
CHV2-01-P	200	458	13	1	1	3 / 8”
CHV2-02-P	200	758	13	1	1	3 / 8”
CHV2-03-P	200	1058	13	1	1	3 / 8”

A.4. Dimensional Drawings



2-pipe

4-pipe

Model	Unit Dimensions (mm)					
	A	B	C	D	E	F
CHV2-01-V	595	450	560	595	277	567
CHV2-02-V	895	750	560	595	277	867
CHV2-03-V	1195	1050	560	595	277	1167

Model	Unit Dimensions (mm)				
	G	H	I	J	K
CHV2-01-V	40	96	270	606	155
CHV2-02-V	40	96	270	606	155
CHV2-03-V	40	96	270	606	155

Model	Unit Dimensions (mm)					
	A	B	C	D	E	F
CHV2-01-P	595	450	560	595	277	567
CHV2-02-P	895	750	560	595	277	867
CHV2-03-P	1195	1050	560	595	277	1167

Model	Unit Dimensions (mm)					
	G	H	I	J	K	L
CHV2-01-P	40	96	270	606	44	111
CHV2-02-P	40	96	270	606	44	111
CHV2-03-P	40	96	270	606	44	111

A.5. Sound power data

Model		CHV2-01					CHV2-02					CHV2-03				
Speed		5	4(H)	3	2(M)	1(L)	5	4(H)	3	2(M)	1(L)	5	4(H)	3	2(M)	1(L)
Sound Power dB(A)		**53.3**	**51**	**48.4**	**45.2**	**42.6**	**56.4**	**53.7**	**49.7**	**45.8**	**42.9**	**55**	**51.3**	**48.1**	**44.7**	**41.5**
Sound Power in 1/3 Octave-bands under ESP:0Pa (dB)	20.0Hz	12.2	10.7	5.1	6.4	12.5	10.2	10.5	5	8.9	8.4	11	14.2	13.6	14.1	11.4
	25.0Hz	15.1	11.4	8.3	8.6	7.6	13.6	12	9.6	10.6	7.9	9.6	11.4	9.6	14.8	7.6
	31.5Hz	8.2	5.2	11.7	4.6	5.5	16	14.7	10.5	11.5	9.9	11.4	6.7	10.8	13.5	7.3
	40.0Hz	7.5	11.2	7	3.6	5.2	12.7	15.2	9.7	7	6	7.6	6.1	10	19.3	6.6
	50.0Hz	7.8	10.2	8.8	6.6	6.9	9.9	10.3	11.9	8.9	10.2	9.1	10.4	7.4	10.7	9.5
	63.0Hz	17.6	16.4	11.8	12.9	10.1	19.9	17.2	13.5	11.9	11.6	17.7	13.2	12.3	10.6	9.8
	80.0Hz	18.2	14	15.8	10.9	9.6	18.4	17.4	15.1	9.6	11.7	18	15.7	17.7	11.5	9
	100.0Hz	26.4	25.8	26.9	25.9	22	29.6	26.5	26.9	26	22.8	23.8	25.5	21.5	17.7	16.2
	125.0Hz	38.1	31.3	31.4	27.2	25.4	38.1	37.3	32.8	26.5	24.1	37.6	31.7	33.8	26.4	24.1
	160.0Hz	38.9	34.8	31	32.1	28.3	45	40.1	33.8	31.4	29.2	39.7	37.6	34.1	29.9	29
	200.0Hz	35.8	33.4	30	29.8	27.4	39.8	36.9	34.6	32.3	28.5	37.9	36.1	33.1	32.3	28.5
	250.0Hz	37.1	35.9	33.4	31.6	32.3	42.2	40.4	35.5	31.8	29.1	40.9	36	34	30.9	27.8
	315.0Hz	41.5	39.3	36.4	34	32.8	45.9	43	38	34.2	32.6	42.5	39.6	35.1	33.2	30.1
	400.0Hz	42	39.7	37.2	35.2	31.2	44.1	42.6	38.1	35.3	33.3	44.8	38.9	36.8	34.2	30.8
	500.0Hz	43.3	40	39.1	35.7	31.9	43.5	43	39.6	35.7	32.8	41.7	38.2	35.6	33	29.2
	630.0Hz	45.5	43.9	41	37.2	34.4	47.6	45.5	40.4	37.1	33.6	44.8	41.9	38.8	35.7	32
	800.0Hz	43.2	41	38.2	35	30.2	47.4	43.8	39.8	35.8	31.9	44.3	41.2	37.8	34.5	31.1
	1000.0Hz	44.3	41.9	39	35.3	31.4	46.5	44.1	40.2	37.4	32.5	46.7	43.4	39.6	35.6	32.8
	1250.0Hz	43.7	41.3	38.4	34.6	30.8	46	44.5	39.4	35.2	31.4	45.8	42.5	38.7	34.8	31.4
	1600.0Hz	42.5	39.6	36.7	34.1	29.3	46.6	42.5	38.2	35.2	30.1	45.7	41.5	38.5	34.4	30.4
	2000.0Hz	39.5	36.6	33.4	30.7	27.3	42.8	40.2	35	30.7	26.3	41.8	38.1	33.5	29.2	25.5
	2500.0Hz	38.9	35.9	33.5	29.9	25.5	41.5	38.8	33.3	28.7	25.2	40.4	36.2	31.1	26.9	23.4
	3150.0Hz	37.1	34.3	31.4	27.7	22.2	39.7	36.3	30.3	25.7	21.5	38	32.9	28.5	24.2	19.9
	4000.0Hz	33.3	30	26.7	22.8	18	35.2	31.7	24.9	20.9	17	33.7	28.3	23.5	19.2	15.7
	5000.0Hz	29.2	26.5	23	18.5	14.8	30.7	27	21	17.7	15.2	28.9	23.6	19.2	16	14.5
	6300.0Hz	26.1	23.1	19.6	15.6	13.2	27.5	23.9	18.2	15.7	14.5	24.8	20.1	16.1	14.8	13.5
	8000.0Hz	21.4	17.8	14.9	13.1	12.2	21.9	18.9	15.5	14.3	13.2	19.8	15.3	13.3	12.8	12.3
	10000.0Hz	16.1	13.5	11.5	10.5	10.3	16.3	13.7	10.9	10.3	10.3	14.3	11.2	10.4	10.2	10.2
	12500.0Hz	9.1	7.7	8	6.9	6.7	9.5	8	7.1	7.1	7	8.3	7.4	6.8	6.9	6.7
	16000.0Hz	4	5.2	8.5	3	2.7	4.3	3.9	3.4	3	3.2	3.7	4.1	3	4.8	3.2

B. Installation

B.1. Safety Precautions

- When installing, performing maintenance or servicing Polar Air fan coil units observe the precautions stated in this manual as well as those stated on the labels attached to the unit.
- Ensure all local and national safety codes, laws, regulations, as well as general electrical and mechanical safety guidelines are followed for installation, maintenance and service.
- The appliance is for indoor use only.
- Ensure the correct power supply is provided.
- If the power supply cord is damaged, it must be replaced by qualified personnel.
- Installing and servicing fan coil unit should be performed by qualified service personnel only.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons lacking in experience and knowledge of the appliance, unless they have been given supervision or instruction concerning it.
- User of this appliance is responsible for his/her own safety.
- Warranty shall be voided if installation instructions and safety precaution stated in this manual are not observed.
- Never cut off the mains supply when unit is under operation. The unit should only be switched off by using the ON-OFF button on the control interface.
- During connections, select pipe pliers according to pipe diameter to avoid damaging units over forced.
- Untreated frozen water and cooling water may cause dirt accumulation and corrosion. Suggest using treated water. Suggested working water pressure is below 1.6 Mpa.
- When units are in cooling mode, suggested freezing water degree is ≥ 7℃; When units are in heating mode, suggested hot water degree is ≤ 60 ℃.
- Condensate water pipe, water connection pipe, water connectors and solenoid valve body must remain heat to avoid condensation.

CAUTIONS

Before any service or maintenance operations turn off the mains electrical supply.

DO NOT turn OFF the main power supply when the unit is operating. Turn off the unit BEFORE turning off the main power

B.2. Before Installation

- The installation site must be established by the system designer or other qualified professional, taking account of the technical requisites and current standards and regulations.
- Coanda fan coil units must be installed by qualified personnel only.
- Coanda fan coil units are designed for horizontal installation in a ceiling, for intake of fresh air from outside and for diverting a small part of the treated air into a neighboring room.
- They must be installed in such a way as to enable treated air to circulate throughout the room and allow the minimum distances required for technical maintenance operations.
- It is advisable to place the unit close to the installation site without removing it from packaging.
- Do not put heavy tools or weights on packaging.
- Upon receipt, the unit and the packaging must be checked for damage sustained in transit and if necessary, a damage claim must be filed with the shipping company.
- Check immediately for installation accessories inside the packaging.
- Do not lift unit by the condensate drain discharge pipe or by the water connections or front panel; lift the unit using four mounting brackets. (Figure B.4.1)
- Check and note the unit serial number.

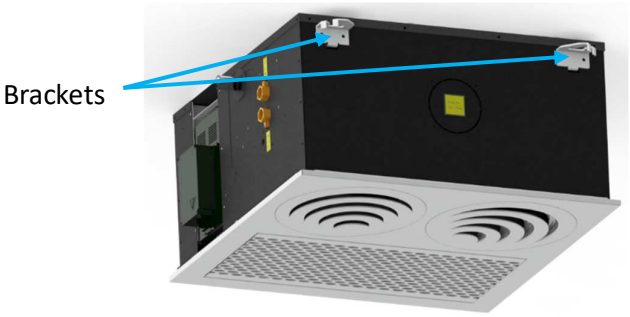


Figure B.4.1

B.3. Installation Location

- Do not install the unit in rooms where flammable gas or alkaline acid substances are present. Aluminum/copper coils and/or internal plastic components can be damaged irreparably.
- Do not install in workshops or kitchens; drawn in oil vapors might deposit on the coils and alter their performance or damage the internal plastic parts of the unit.
- If installation of unit includes using a lift, insert a plywood sheet between the unit and the lift forks to avoid damaging unit. (Figure B.5.1)
- It is recommended to locate the unit near one side of room to ensure optimum air distribution. (Figure B.5.2)
- Generally, the best louver position is the one which allows air diffusion along the ceiling. Alternative positions can be selected.
- Confirm sufficient space is provided to allow removal of panels from the ceiling in the selected position and to allow enough clearance for maintenance and servicing operations.

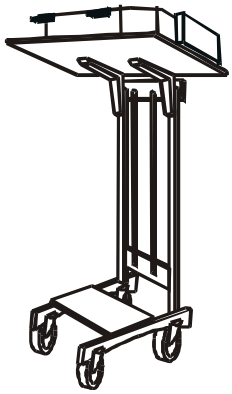


Figure B.5.1

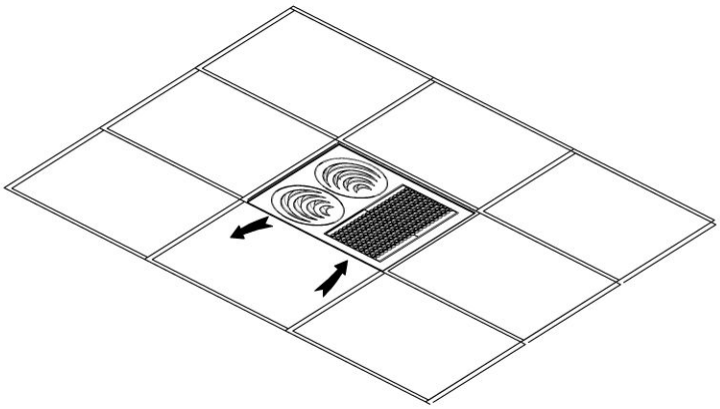


Figure B.5.2

B.4. Installation and False Ceiling Clearance

- Verify inlet and outlet grilles are not obstructed to ensure proper air flow.
- Confirm location allows condensate to be properly drained.
- Confirm height between the bottom of upper deck and top of ceiling is sufficient for installation. (Figure B.6.1)
- Ensure there is sufficient space around the unit to provide installation and service.

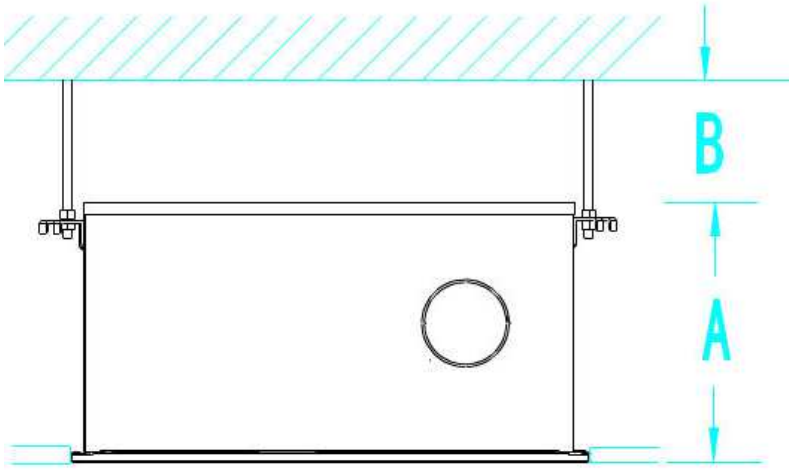


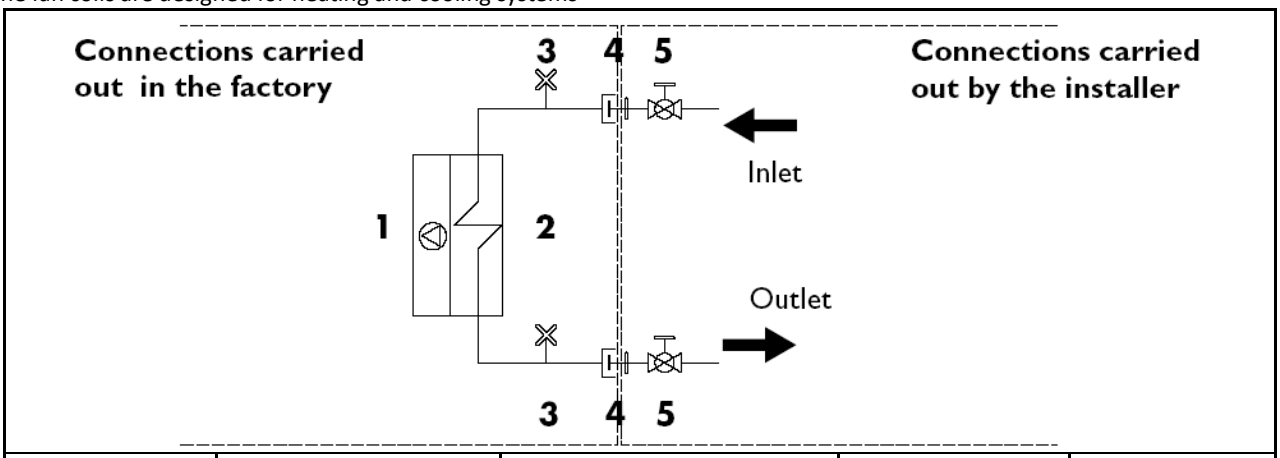
Figure B.6.1

Model	A (mm)	B (mm)
CHV2-01/02/03	Maximum: 275	More than 10

B.5. Pipe Works

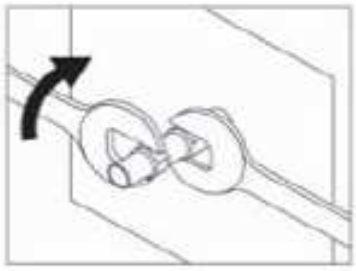
Water Connection

The fan coils are designed for heating and cooling systems



1. Fan	2. Heat exchanger	3. Air Vent / Water Purge	4. Joint	5. Valve

CHV2 unit uses a 1/2" water piping connection with gaskets. It is advised to tighten the connections with two wrenches.



B.6. Condensate Drainage Connection

- The unit is fitted with a condensate pump with a maximum of 500 mm lift.
- The unit is provided with a Ø25.4 mm ABS drainage head.
- Confirm drain outlet has not been damaged before connecting drain pipe to unit.
- Discharge pipe may be connected with hose clamp. (Figure B.7.1)
- Insulate drain pipe after installation.

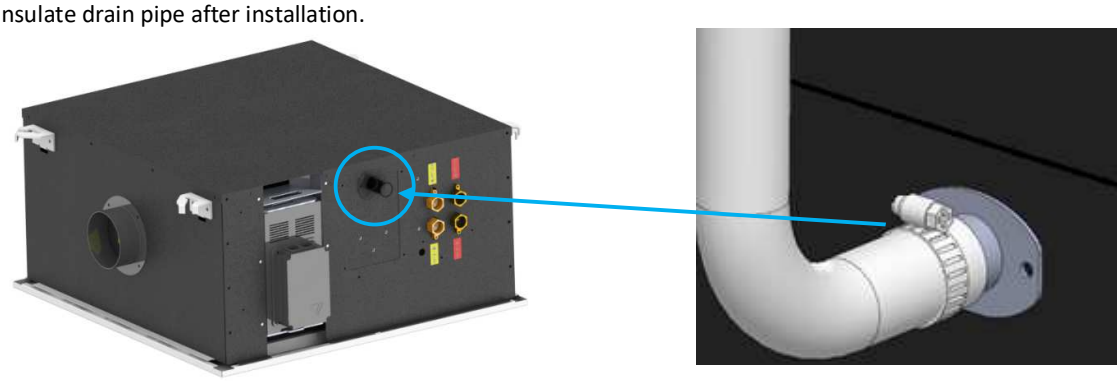


Figure B.8.1

CAUTION

The drainage head's material is ABS. Using unsuitable glue may damage the drainage outlet.

B.7. External Drain Pan Installation

1. Align the two screw holes in the fixing plate to the two holes in the external drain pan. (Figure B.8.1)
2. Make sure the drain pan is horizontal.
3. Tighten the two screws while making sure the external drain pan is installed flush against the fixing plate. (Figure B.8.2)
4. When the installation is completed, it is necessary to wrap the connecting pipe with thermal insulation to prevent condensation on ceiling tiles.

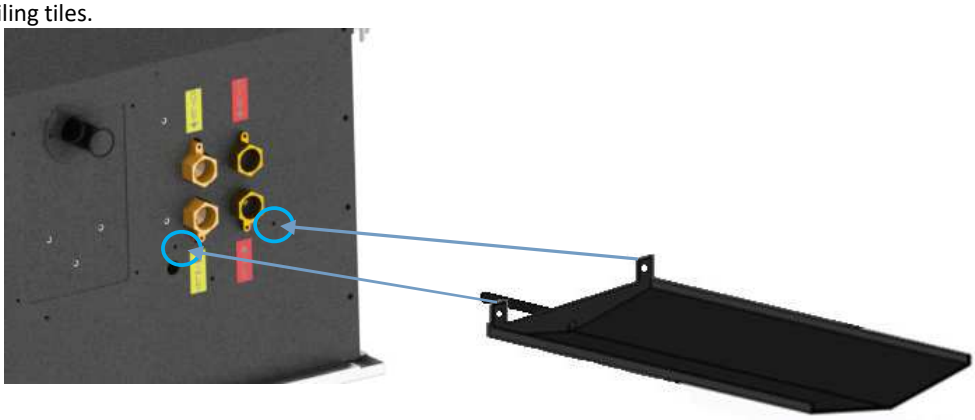


Figure B.9.1

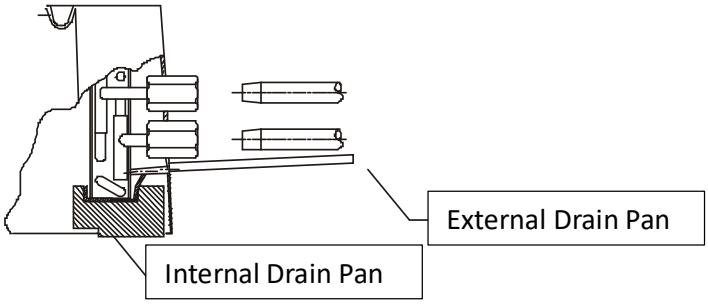


Figure B.9.2

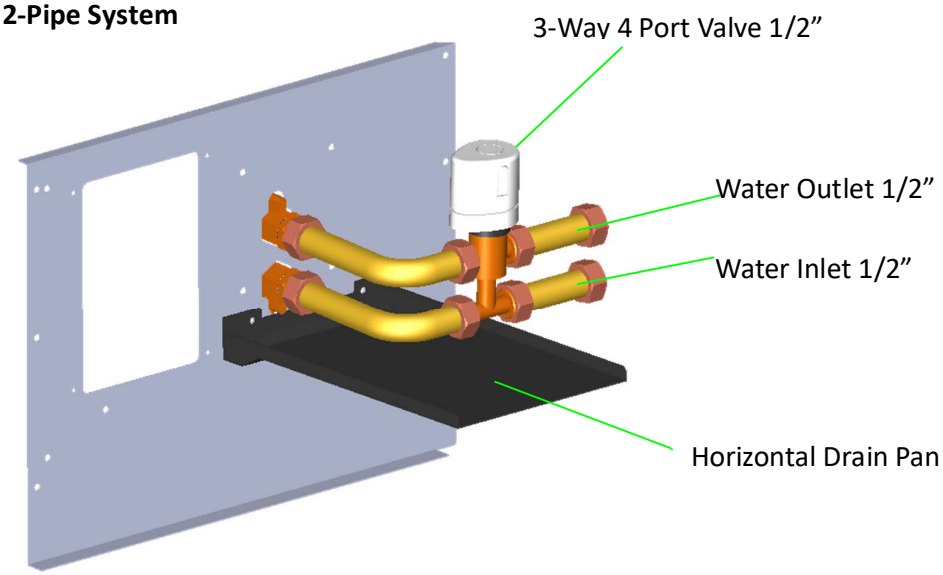
B.8. Valve Installation

Review below table for information on valve diameter.

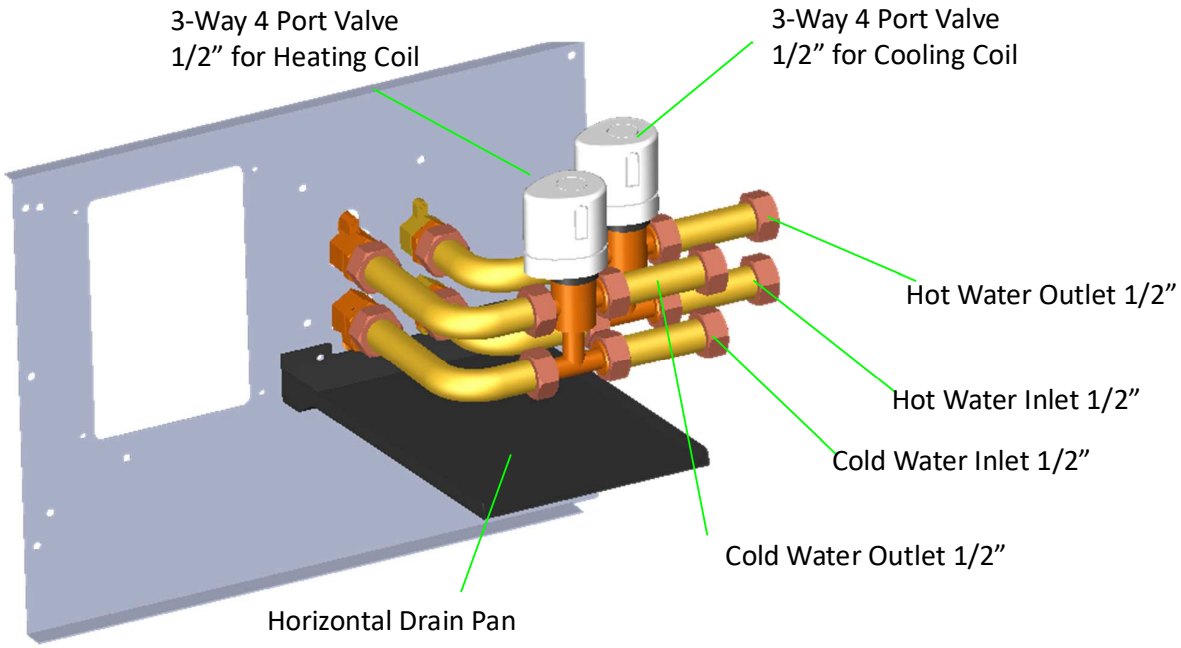
Model	External valve information	
	Type	Connector dia. (inch)
CHV2-01/02/03	2-way & 3-way	1/2

See drawings of external valve installation below:

Piping for 2-Pipe System



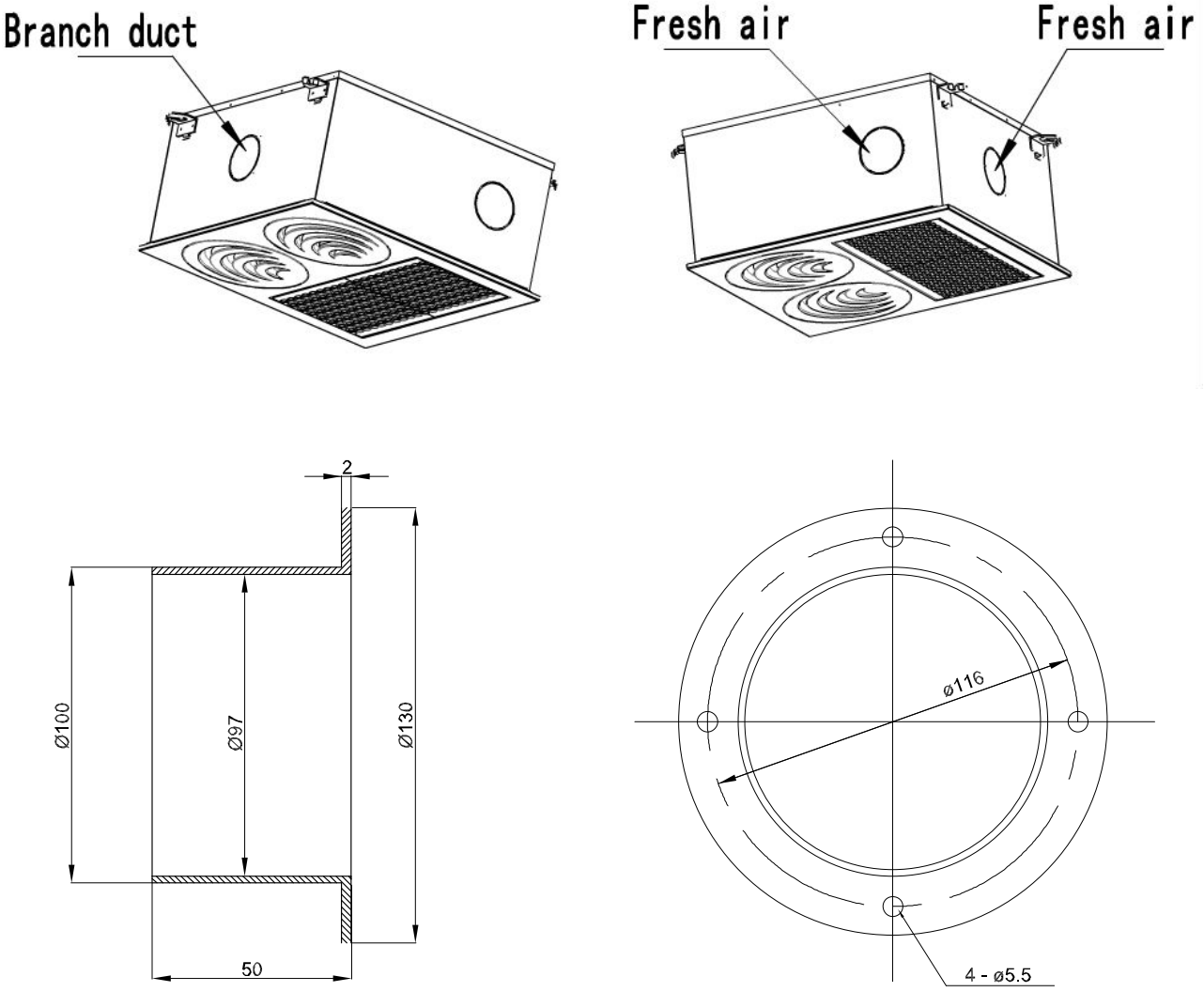
Piping for 4-Pipe System



B.9. Fresh Air and Branch Duct Connection

- The fresh air system for CHV2 unit allows up to 15% of unit airflow. (Maximum air flow per connection is 100 m^3/h)
- There are two openings for connecting fresh air ducts and one opening for connecting a branch duct.
- Flanges and conduits can be installed onto casing.
- Conduits can be flexible polyester with spring core or corrugated aluminum (Dia.100mm) externally insulated.

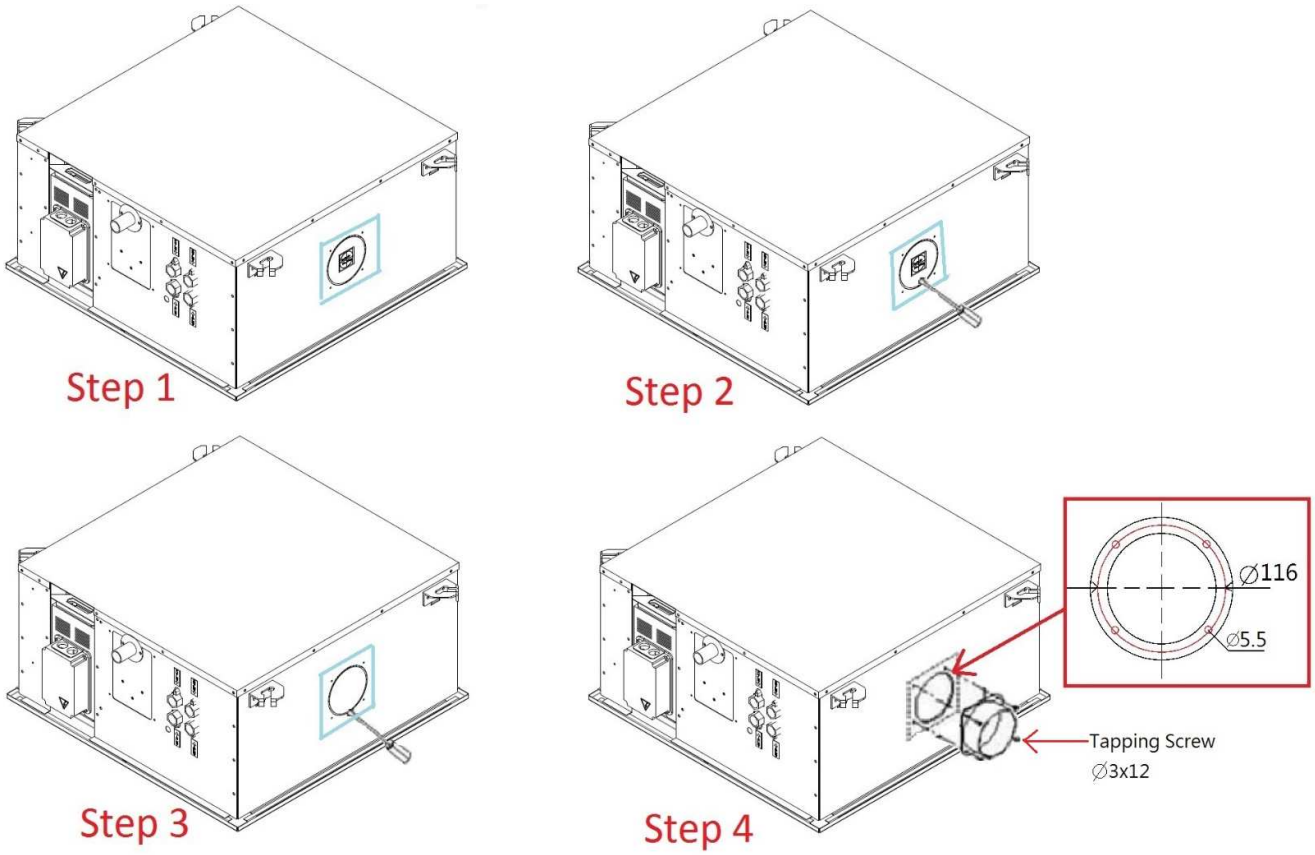
Flanges (spigots) are available as separate accessory items.



Flange Dimensions (shown in mm)

Connection Procedures:

1. Look for the yellow stickers on the casing for locations of branch duct and fresh air intake connections.
2. Each sticker is at the center of a knockout hole underneath the casing insulation. Use a cutter and follow along the pre-cut circular marking as shown and trim off the insulation.
3. Knock out the pre-cut hole.
4. Connect the flange onto the opening with four tapping screws. (ø 3 mm x 12 mm)

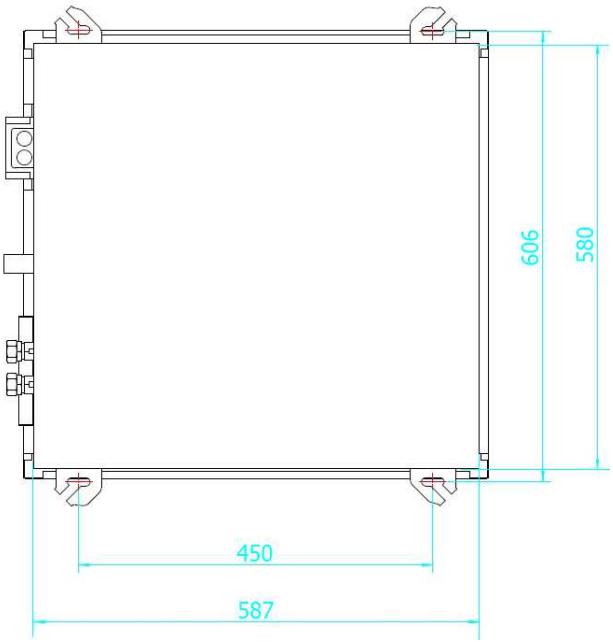


(All dimensions shown in mm)

B.10. Suspension Bolts Layout and Ceiling Opening

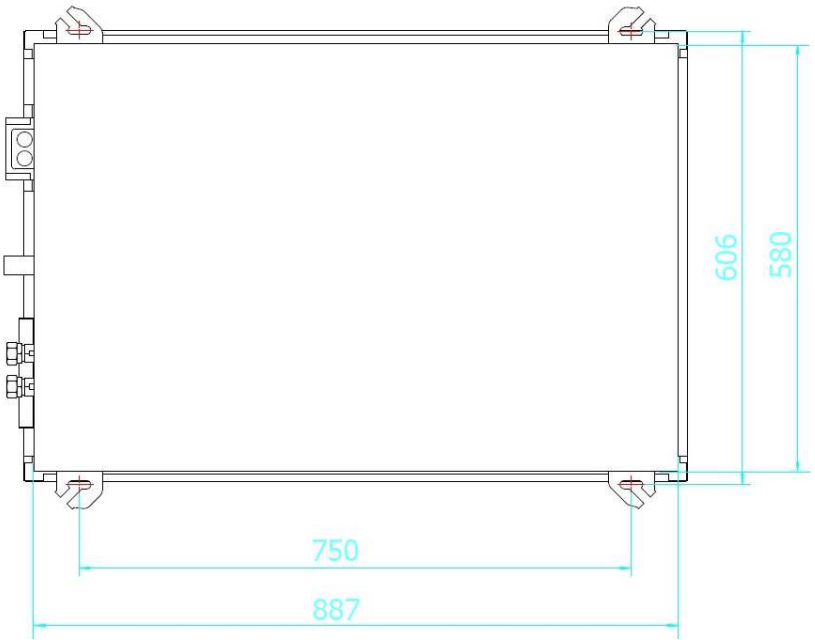
Using the installation template, open the ceiling panels and install the suspension bolts as in the images below.

CHV2-01



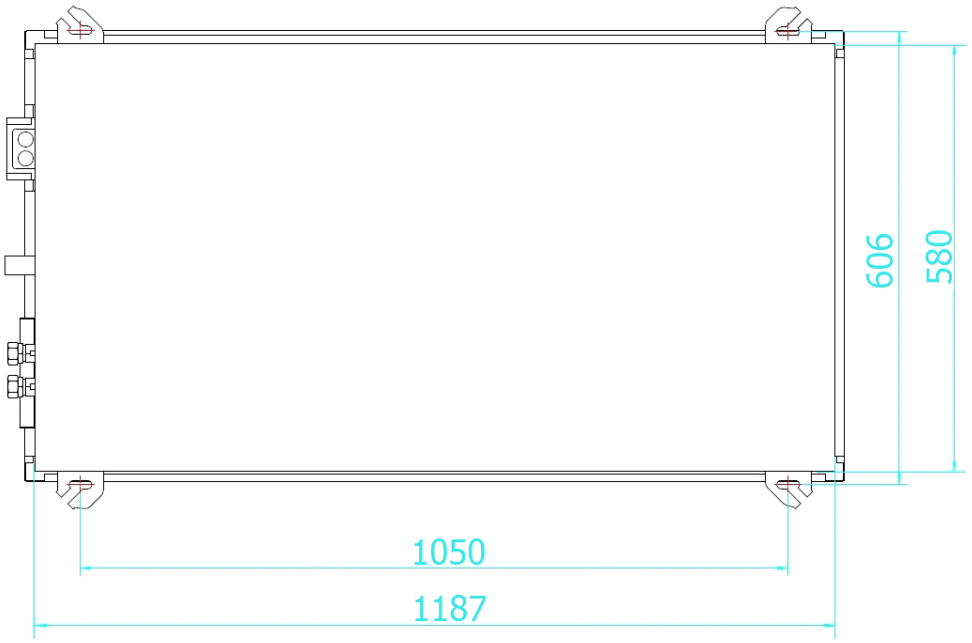
580 x 587: Dimensions for Opening
606 x 450: Suspension Bolts

CHV2-02



580 x 887: Dimensions for Opening
606 x 750: Suspension Bolts

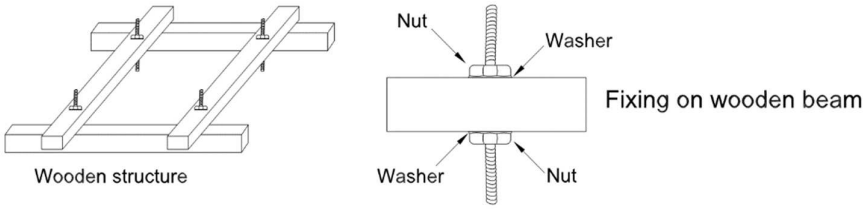
CHV2-03



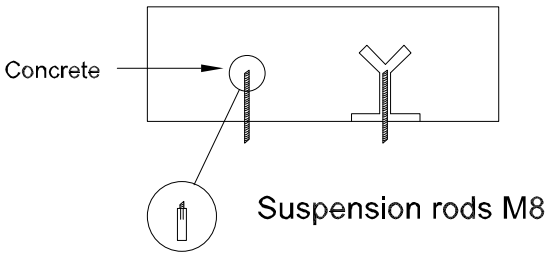
580 x 1187: Dimensions for Opening
606 x 1050: Suspension Bolts

(All dimensions shown in mm)

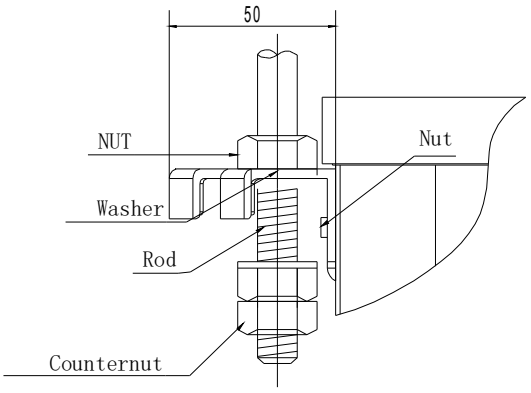
- Mark position of field supplied suspension rods, water lines, condensate drain pipe, line voltage and low voltage wiring.
- Properly attach suspension rods to structure above.
- Do not tighten nuts and counter nuts. This should only be done after all connections are made and leveling of unit is confirmed.
- Verify installation accommodates proper condensate drainage to pump.
- Be careful while lifting fan coil unit into position. Do not lift the unit by condensate tray.



Fixing on wooden beam

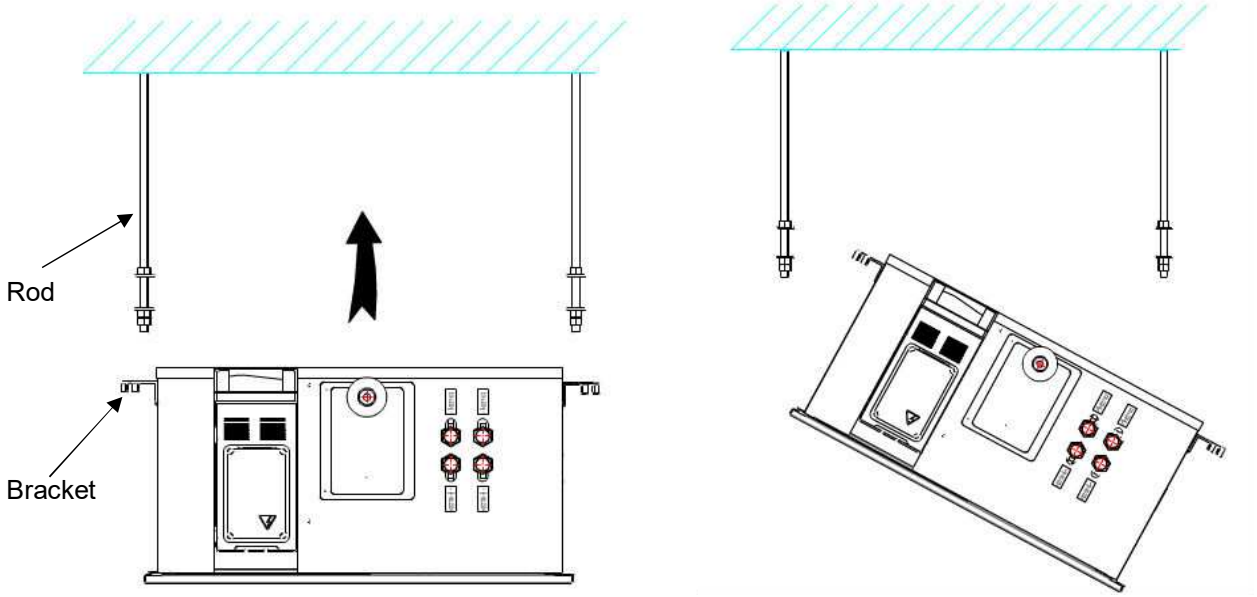


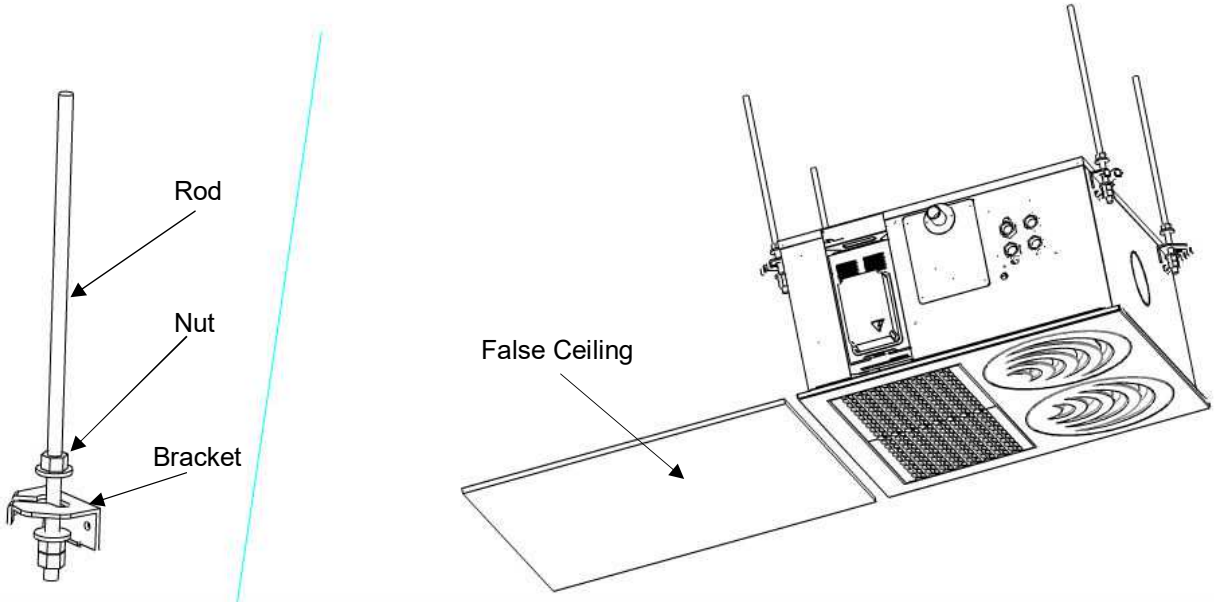
Fixing on cement ceiling.



B.11. Suspension Installation

1. Lift unit (without front panel) with care by four corners only. Do not lift unit by the condensate drain discharge pipe or piping connections.
2. Incline and insert the unit into the ceiling. Insert support rods into the bracket slot.
3. Line up the unit to the supporting bars of the ceiling by tightening the nuts and counter nuts of the suspension rods.
4. After connecting the condensate drain piping and piping connections, confirm fan coil is level.
5. Check to ensure the unit is level. Drain will be at lowest point when unit is level.
6. Tighten nuts on the suspended rods.





B.12. Interconnecting Wiring

- It is recommended using screened cable in electrically noisy areas.
- Do not install fan coil unit in a location where electromagnetic waves may be directly emitted towards infra-red receiver on the unit.
- Install the unit and components as far away as is practical (at least 5m) from any electromagnetic wave source.
- Use shielded sensor cable in where electromagnetic waves exist.
- Install a noise filter if necessary.

NOTES

Please ensure the cable of the main power supply is longer than 500mm from control box terminal block. This is to ensure the control box can be slid out easily during maintenance activities.

Always take safety precautions before wiring for main supply. ***See section B.1, Safety Precautions.***

Wiring Procedures

1. Open the terminal block cover by removing the 4 screws. (Figure B.13.1)
2. Connect power cable to the terminal according to the wiring diagram.
3. Connect room temperature sensor and coil temperature sensors to the control box.
4. Connect receiver display.
5. Connect wall pad (optional).
6. Slide the control box into the unit casing. (Figure B.13.2)

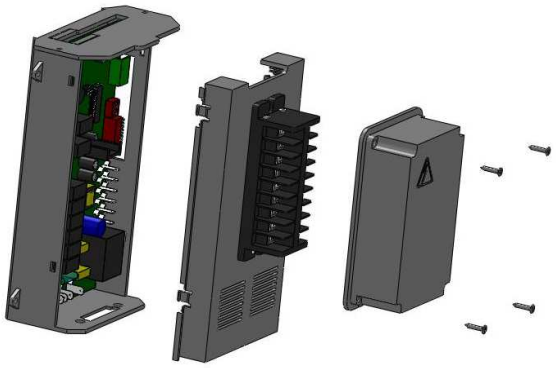


Figure B.14.1

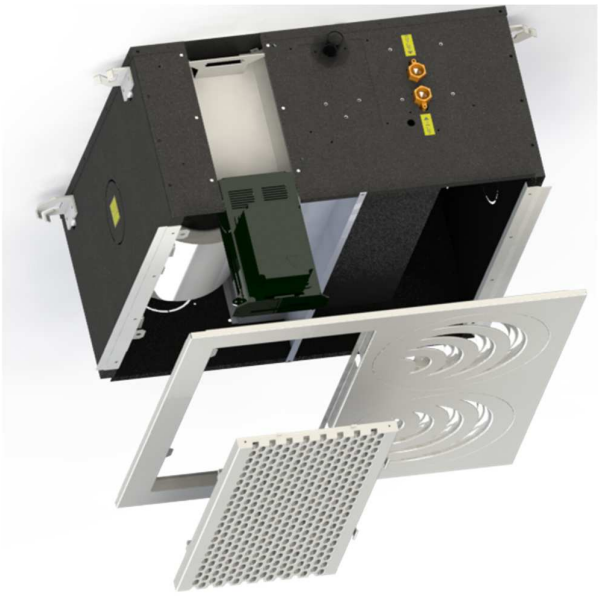


Figure B.14.2

C. Maintenance

- Turn off the main power switch before performing any service or maintenance operations. Please see section B.1 **Safety Precautions**.
- The air filter is made of acrylic fiber and is washable in water. To remove filter simply open the intake grille by releasing the two fasteners.
- Check the filter before the operating season and then periodically while in use; clean or replace as necessary.

C.1. For Units Out Of Use for an Extended Period.

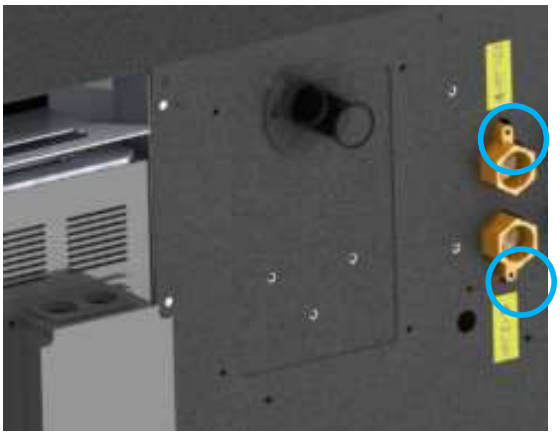
Prior to restarting the unit:

- Clean or replace the air filters.
- Check and remove any obstruction from the external drain pan and the internal drain pan.

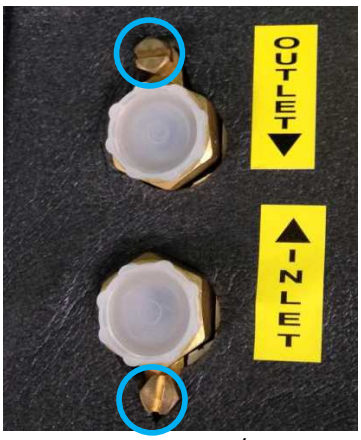
C.2. Extra Maintenance

- The electrical panel is easily accessible by removing the cover panel.
- Inspection, servicing, and replacement of internal components such as coil, condensate pump, float switch and drain pan are accessible via cover panel.
- Be aware of water spillage when removing the condensate drain pan
- Release the drain pan fixing screws and remove the condensate drain pan with care.

C.3. Air Vent and Water Purge Valve



Step 1: The circled areas indicate Air vent / Water purge valve.



Step 2: Operate Air vent / Water purge valve by turning the knobs.

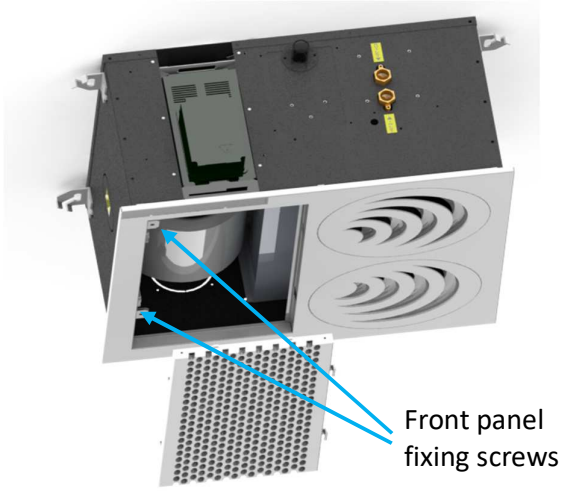
C.4. Filter Removal and Cleaning

Step 1: Unlock the two fixing screws on front panel.

Step 2: Open the grille downward with care.

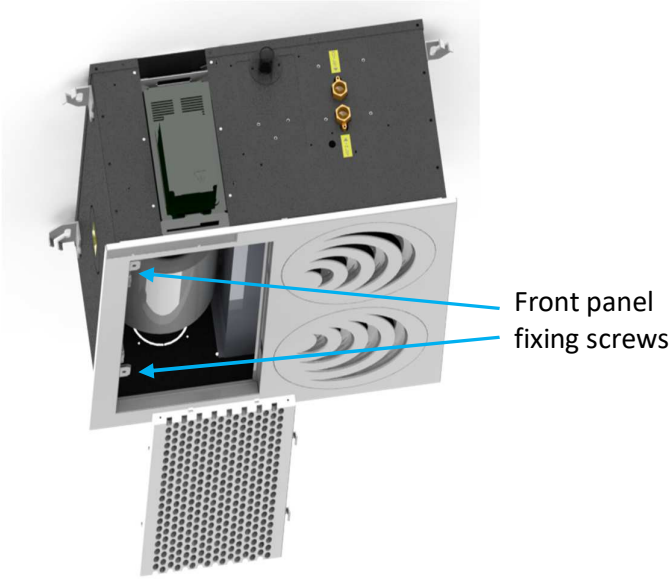
Step 3: Pull the filter out along the slot.

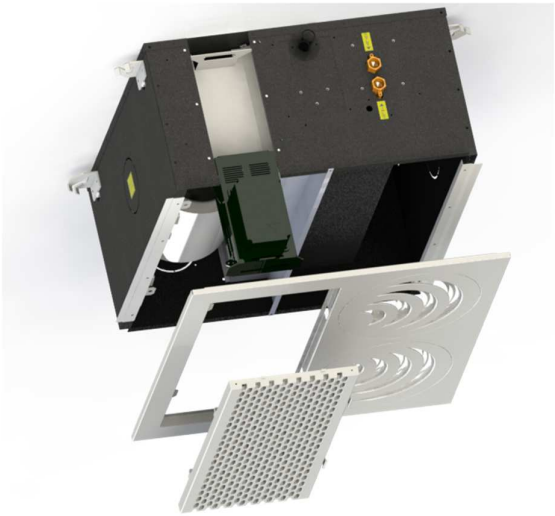
Step 4: Clean the filter and reassemble.



C.5. Control Box Replacement

Step 1: Open the return air grille

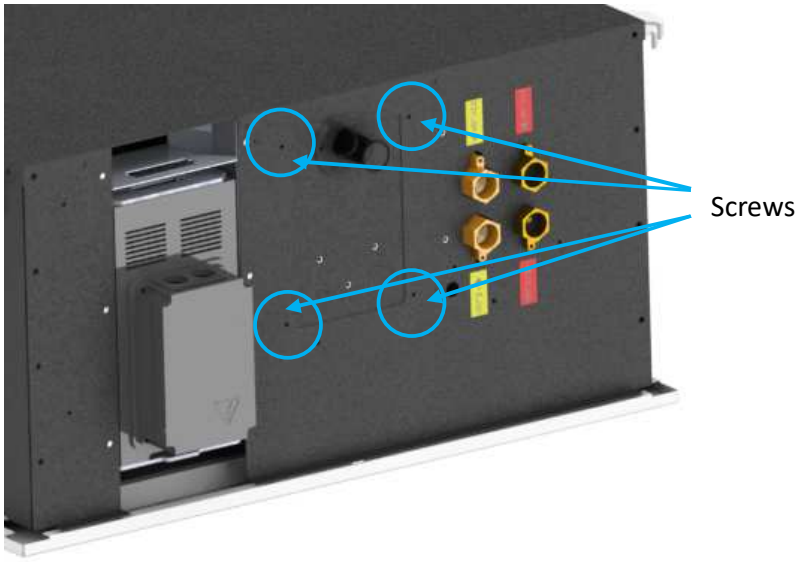




Step 2: Remove front panel after removing the two fixing screws.
Step 3: Pull out the plug and play control box after removing 4 screws on the control box.
Step 4: Unplug the wiring on the terminal block and replace with a new control box.

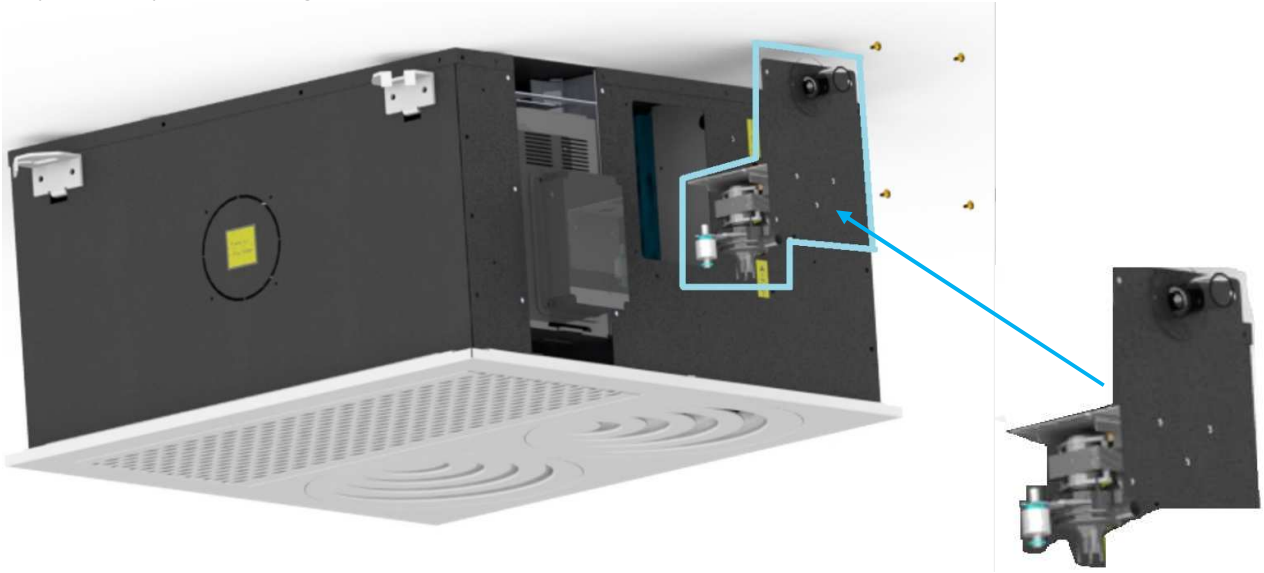
C.6. Condensate Drain Pump and Float Switch Replacement

Step 1: Remove 4 screws from the side casing



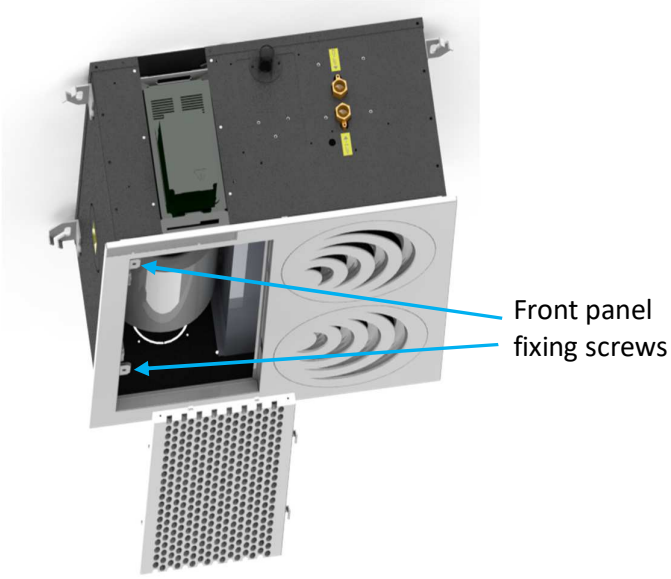
Step 2: Pull out the condensate pump kit.

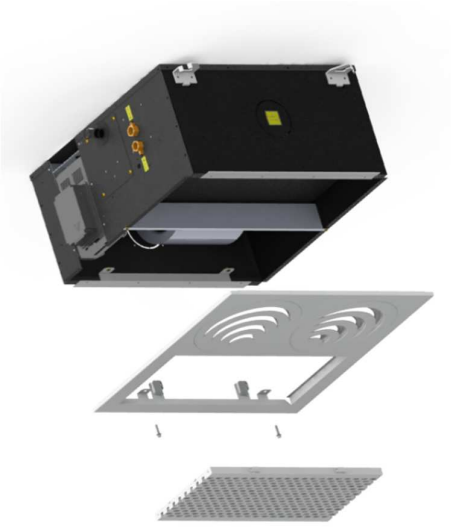
Step 3: Replace it and tighten the 4 screws



C.7. Fan Deck or Coil Assembly Replacement

Step 1: Open the return air grille and remove the front panel by two fixing screws

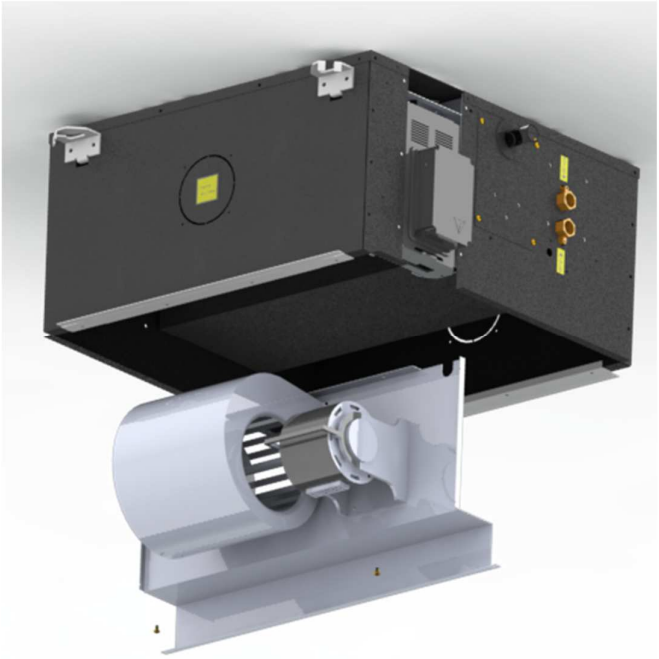




Step 2: Pull out the Fan Deck

Step 3: Remove the internal drain pan and coil assembly

Step 4: Replace new fan deck or coil assembly



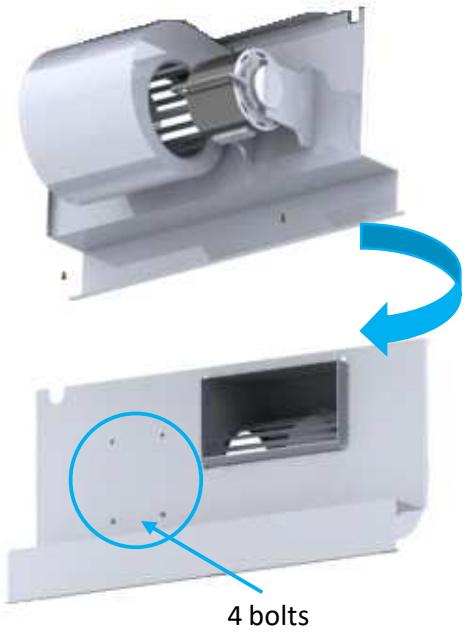
C.8. Motor and Fan Blower Replacement

Step 1: Repeat Step 1 to 3 from Section C.7.

Step 2: Use a spanner to remove the fan blower.

Step 3: Remove the motor by undoing the 4 bolts.

Step 4: Disconnect motor wire connector and replace motor or fan blower.



C.9. Electric Heater Replacement

Step 1: Unplug PTC Type Electric Heater connector from control box.

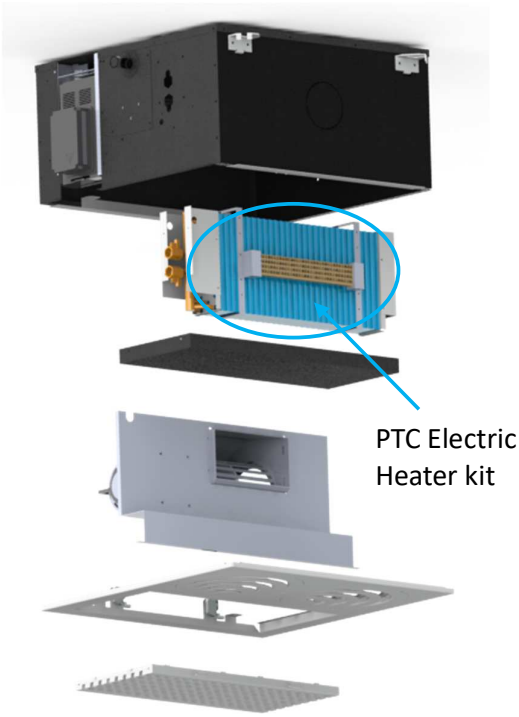
Step 2: Repeat Step 1 to 3 from Section C.7.

Step 3: Remove mounting bracket of PTC Type Electric Heater from the coil.

Step 4: Replace Electric Heater and tighten at the middle of coil.

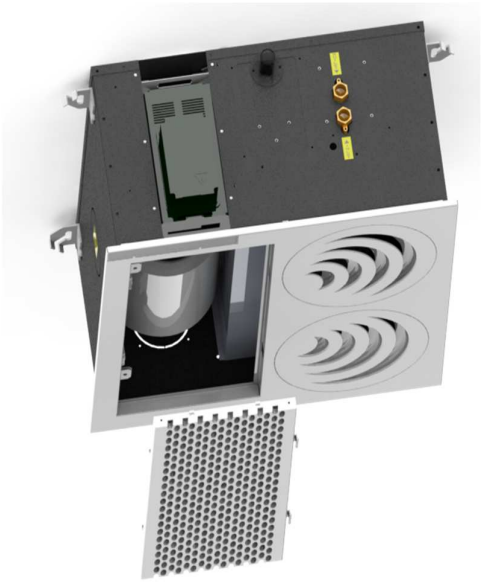
Step 5: Reinstall the coil, drain pan, fan deck and front panel.

Step 6: Connect Heater connector to the plug on control box.

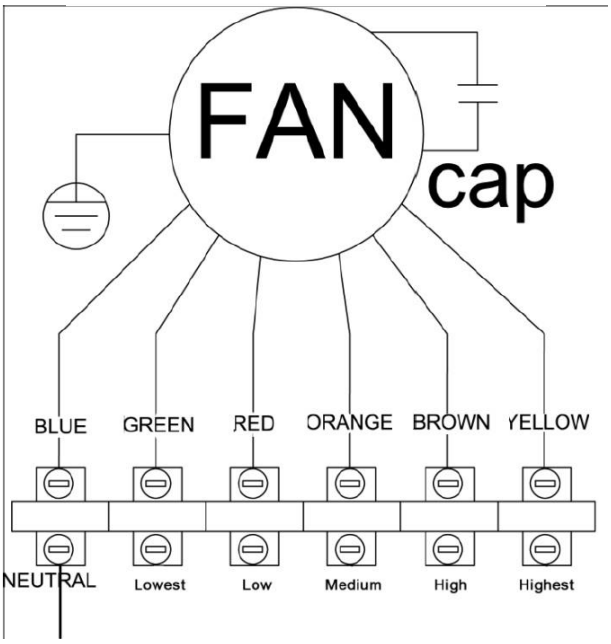


C.10. Fan Speed Customization

Step 1: Remove return air grill;



Step 2: The 3 output wires from Control PCB for fan speed (labeled LF / MF / HF) may be rewired to any of the 5 input terminals for Motor. (labeled 1, 2, 3, 4, 5) ONE PCB output wire to ONE motor input terminal.



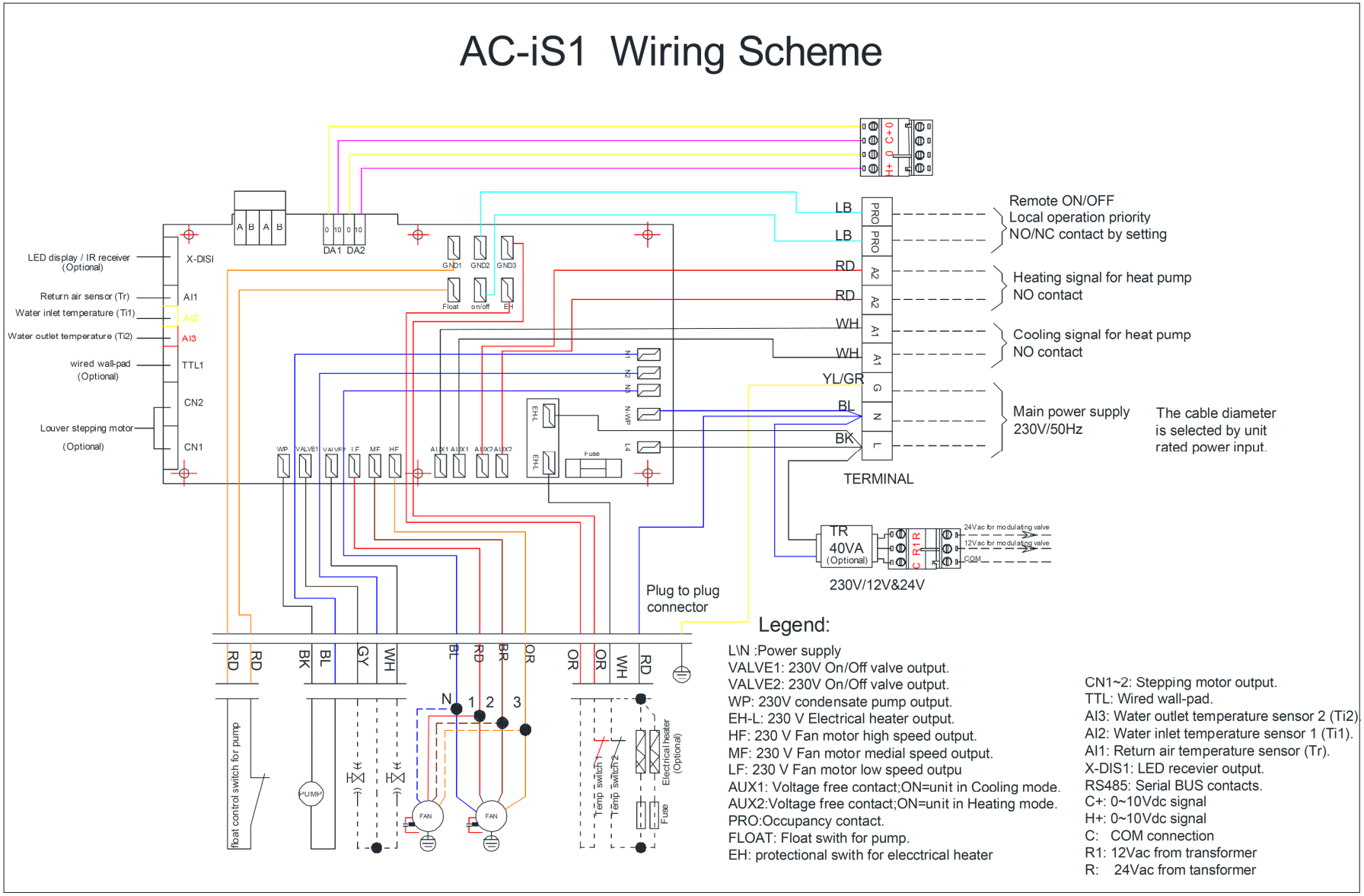
D. Control Specifications: Intelligent Control (I Type)

D.1. I/O Port Definitions

I/O		Code	2-Pipe
Analogue Input	Return air Sensor	AI1	Return air temperature (Tr)
	Chilled water Sensor	AI2	Water inlet temperature sensor (Ti1)
	Hot water Sensor	AI3	Water outlet temperature sensor (Ti2)
Input	IR receiver	X-DIS 1	Digital communication port to LED display/IR receiver board.
	Wired wall pad	TTL1	Digital communication port to wired wall-pad board.
Digital input	Occupancy contact	ON/OFF	NO/NC contact by setting
	Float switch	Float	Voltage-free (NC). The contact is connected with float switch (NC);
	Electrical heater safety switch	EH	Voltage-free (NC). The contact is connected with E-heater safeties.
Power input	Phase	L	Power supply to the PCB;
	Neutral	N	Power supply to the PCB;
	Earth	G	Power supply to the PCB;
Voltage output	High fan speed	HF	Voltage output (L)
	Medium fan speed	MF	Voltage output (L)
	Low fan speed	LF	Voltage output (L)
	Valve1	MTV1	On/off valve
	Valve2	MTV2	On/off valve
	Water pump	WP	Voltage output (L), Power supply to condensate pump.
	Voltage of electrical heater (Live)	L-EH	Voltage output (L), maximum 30A.
Output	Stepping motor	CN1, CN2	Power supply to louver stepping motors.
	Cooling signal contact.	AUX1	Voltage free contact. Maximum load 5A.
	Heating signal contact.	AUX2	Voltage free contact. Maximum load 5A.
	Modulating valve control	DA1	0~10VDC
	Modulating valve control	DA1	0~10VDC
	In Modbus signal	AB	Terminals for local network serial connection
	Out Modbus signal	AB	

D.2. Wiring Diagrams

Standard I Type Control PCB



Fan Coil Unit ON/OFF

There are 4 ways to turn the system on or off:

- By the ON/OFF button on the remote handset or wired wall pad.
- By the programmable timer on the handset or wired wall pad.
- By the manual control button on the fan coil unit.
- By Modbus setting.

Auto Restart

The system uses a non-volatile memory to save the present operation parameters when system is turned off or in case of system failure or cessation of power supply.

The restored parameter data set depends on the type of user interface.
a) Handset only user interface:
When the power ON signal is received by the fan coil unit and no wired wall-pad is installed, the Mode, Fan Speed, Set temperature will be the same as the handset setting before the last power OFF.

b) Wall pad only OR wall pad and handset user interface:
When the power ON signal is received by the fan coil unit and a wired wall pad is installed, the Mode, Fan Speed, Set temperature and Timer ON/OFF weekly program will be the same as the wall pad setting before the last power OFF.

D.3. Control Logic For 2-Pipe System

D.3.1. With Modulating Valve Configuration

COOL MODE

When unit is turned on in cooling mode.

If Tr ≥ Ts + 1ºC (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed. DA1 is turned on at 10 for 2 minutes, then check Ti1:

- When Ti1<=8ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting PID calculation. The output is minimum output (Modbus300015 setting) ~10VDC.
- When 8<Ti1<=10ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting minus 1 PID calculation. The output is minimum output (Modbus300015 setting) ~10 VDC.
- When 10<Ti1<=12ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting minus 2 PID calculation. The output is minimum output (Modbus300015 setting) ~10 VDC.
- When 12<Ti1<=15ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting minus 3 PID calculation. The output is minimum output (Modbus300015 setting) ~10 VDC.
- When 15<Ti1<=28ºC (Modbus 300017 setting), DA1 output is kept at 10 VDC.
- When Ti1>28ºC(Modbus 300017 setting), DA1 output is at minimum (Modbus300016 setting) and report pre-heat alarm.
- If Tr < Ts-1ºC (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA1 output is 0 VDC.
- When unit is turned off, MTV1 and AUX1 are off. DA1 is 0 VDC. Fan is turned off delaying 30s.
- The range of Ts is 16 - 30ºC.
- Indoor fan speed can be adjusted to low, medium, high and auto.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If Ti1 ≦ 2 ºC for 2 minutes:

- MTV1 is turned off.
- DA1 is set to 0%.
- Indoor fan is turned on to Medium speed if fan runs at low speed.

If Ti1 ≧ 5ºC for 2 minutes:

- MTV1 is turned on.
- DA1 is set to original status.
- Indoor fan is changed to setting speed.

FAN MODE

Indoor fan speed can be adjusted for low, medium and high. If fan speed is set auto by Modbus, fan is running at low speed.

HEAT MODE

Without Electrical Heater（Modbus300047=0）

When unit is turned on in heating mode.

When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV1 and AUX2 is turned on. DA1 is at 10 VDC for 2 minutes, then check Ti1:

- If Ti1 < 28ºC (Modbus 300017 setting), fan is turned on at low speed. DA1 is at 10 VDC.
- If 28ºC<Ti1< 28（Modbus 300017 setting）+4ºC, fan is on at original state. DA1 is at original state.
- If Ti1 ≥ 28（Modbus 300017 setting）+4ºC, fan is on at setting speed. DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300028 setting PID calculation. The output is minimum output (Modbus300015 setting) ~10 VDC.
- If Ti1 sensor is damaged, fan runs at setting speed.
- When Tr > Ts+1 ºC (Modbus 300033 setting), MTV1 and AUX2 is turned off. DA1 is at 0 VDC. Fan is turned on at lowest speed.
- When unit is turned off, MTV1 and AUX2 is turned off. DA1 is at 00 VDC. Fan is turned off delaying 2 minutes.

With Electrical Heater as booster（Modbus300047=1）
When unit is turned on in heating mode.

When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV1 and AUX2 is turned on. Fan is turned on at setting speed. DA1 is at 10 VDC for 2 minutes, then check Ti1:

- If Ti1 < 28ºC (Modbus 300017 setting), EH is turned on. DA1 is at 10 VDC.
- If 28ºC<Ti1< 28（Modbus 300017 setting）+4ºC, EH is kept at original state. DA1 is at original state.
- If Ti1 ≥ 28（Modbus 300017 setting）+4ºC, EH is turned off. DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300028 setting PID calculation. The output is minimum output (Modbus300015 setting) ~10 VDC.
- If Ti1 sensor is damaged, fan runs at setting speed.
- When Tr > Ts+1 ºC (Modbus 300033 setting), MTV1 and AUX2 is turned off. EH is turned off. DA1 is at 0 VDC. Fan is turned on at low speed.
- When unit is turned off, MTV1 and AUX2 is turned off. DA1 is at 0 VDC. Fan is turned off delaying 2 minutes.

With Electrical Heater as primary（Modbus300047=2）
When unit is turned on in heating mode.

- When Ti2 ≤ 35ºC (or Ti2 is broken) and Tr ≤ Ts - 1 ºC(Modbus 300033 setting). Fan is turned on at setting speed. EH is turned on.
- When Tr > Ts+1 ºC(Modbus 300033 setting). EH is turned off. Fan is turned on at low speed.
- When unit is turned off, EH is turned off. Fan is turned off delaying 2 minutes.

OVER-HEAT PROTECTION OF INDOOR COIL
- If Ti1 ≥ 75ºC, then MTV1, AUX2, DA1 and EH are turned off. Indoor fan remains on and runs at high speed.
- If Ti1 < 70ºC, then unit keep original state.
- If the indoor coil temperature sensor is damaged or not connected, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

DEHUMIDIFICATION MODE
When unit is turned on in dehumidification mode:

- AUX1 is turned on. Ts is 24 ºC.
- If Tr ≥ 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA1 is on at 3 times of (Modbus 300016 setting). Fan is turned on at low speed.
- If 16ºC ≤ Tr < 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA1 is on at double of (Modbus 300016 setting). Fan is turned on at low speed.
- If Tr < 16ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA1 is on at (Modbus
- 300016 setting). Fan is turned on at low speed.
- At the end of the above dehumidification cycle, the system will decide the next dehumidification control option.

AUTO MODE
When unit is turned on in Auto mode, fan is turned on at setting speed for 30S, then check Tr and Ts.
- If Ts>=Tr+3 ºC, the unit runs in heating mode.
- If Tr-3 ºC<Ts<Tr+3 ºC, the unit runs in fan mode.
- If Ts<Tr-3 ºC, the unit runs in cooling mode.
- If unit working mode is confirmed, the unit will not change the working mode. After the unit is turned off and restart it in 2 hours, working mode will be confirmed again.

PRO INPUT FUNCTION

When 100004=0.
The unit is on:
- PRO input is closed for 60S, the unit is turned off.
- PRO input is open for 60S, the unit is turned on.

When 100004=1.

- The unit is on or standby, PRO input is open or closed, the unit is kept original state.
- The unit is off.
- PRO input is closed for 30S, MTV1 is turned on, DA1 is open at double of minimum setting (Modbus 300027 setting. Fan is turn on at low speed.
- PRO input is opened for 30S, MTV1 is off, DA1 is 0 VDC, Fan is turn off.
- In period of PRO closed time, if unit receives instruction from remote handset, wired wall pad or Modbus, the unit will work according to the instruction at once.

D.3.2. With 6-way modulating Valve Configuration

COOL MODE

When unit is turned on in cooling mode.

If Tr ≥ Ts + 1ºC (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed. DA1 is turned on at 0 VDC for 2 minutes, then check Ti1,

- When Ti1<=8ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting PID calculation. The output is 4~0VDC.
- When 8<Ti1<=10ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting minus 1 PID calculation. The output is 4~0VDC.
- When 10<Ti1<=12ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting minus 2 PID calculation. The output is 4~0VDC.
- When 12<Ti1<=15ºC, DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting minus 3 PID calculation. The output is 4~0VDC.
- When 15<Ti1<=28ºC (Modbus 300017 setting), DA1 output is kept at 0VDC.
- When Ti1>28ºC (Modbus 300017 setting), DA1 output is 4VDC and report pre-heat alarm.
- If Tr < Ts-1ºC (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA1 output is 5VDC.
- When unit is turned off, MTV1 and AUX1 are off. DA1 is 5VDC. Fan is turned off delaying 30s.
- The range of Ts is 16 - 30ºC
- Indoor fan speed can be adjusted to low, medium, high and auto.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If Ti1 ≦ 2 ºC for 2 minutes

- MTV1 is turned off.
- DA1 is set to 5 VDC.
- Indoor fan is turned on to Medium speed if fan runs at low speed.

If Ti1 ≧ 5ºC for 2 minutes

- MTV1 is turned ON,
- DA1 is set to original status,
- Indoor fan is changed to setting speed

FAN MODE

Indoor fan speed can be adjusted for low, medium and high. If fan speed is set auto by Modbus, fan is running at low speed.

HEAT MODE

Without Electrical Heater（Modbus300047=0）

When unit is turned on in heating mode.

When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV2 and AUX2 is turned on. DA1 is at 10VDC for 2 minutes, then check Ti1:

- If Ti1 < 28ºC (Modbus 300017 setting), fan is turned on at low speed. DA1 is at 10VDC.
- If 28ºC<Ti1< 28（Modbus 300017 setting）+4ºC, fan is on at original state. DA1 is at original state.
- If Ti1 ≥ 28（Modbus 300017 setting）+4ºC, fan is on at setting speed. DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300028 setting PID calculation. The output is 6~10VDC.
- If Ti1 sensor is damaged, fan runs at setting speed.
- When Tr > Ts+1ºC (Modbus 300033 setting), MTV1 and AUX2 is turned off. DA2 is at 5VDC. Fan is turned on at lowest speed.
- When unit is turned off, MTV1 and AUX2 is turned off. DA1 is at 5VDC. Fan is turned off delaying 2 minutes.

With Electrical Heater as booster（Modbus300047=1）

When unit is turned on in heating mode.

When Tr ≤ Ts - 1 ºC(Modbus 300033 setting) , MTV2 and AUX2 is turned on. Fan is turned on at setting speed. DA1 is at 10 VDC for 2 minutes, then check Ti1:

- If Ti1 < 28ºC (Modbus 300017 setting), EH is turned on. DA1 is at 10 VDC.
- If 28ºC<Ti1< 28（Modbus 3000017 setting）+4ºC, EH is kept at original state. DA1 is at original state.
- If Ti1 ≥ 28（Modbus 300017 setting）+4ºC, EH is turned off. DA1 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300028 setting PID calculation. The output is 6~10 VDC.
- If Ti1 sensor is damaged, fan runs at setting speed.
- When Tr > Ts +1ºC (Modbus 300033 setting), MTV2 and AUX2 is turned off. EH is turned off. DA1 is at 5 VDC. Fan is turned on at low speed.
- When unit is turned off, MTV2 and AUX2 is turned off. DA1 is at 5 VDC. Fan is turned off delaying 2 minutes.

OVER-HEAT PROTECTION OF INDOOR COIL

- If Ti1 ≥ 75ºC, then MTV1, AUX2, DA1 and EH are turned off. Indoor fan remains on and runs at high speed.
- If Ti1 < 70ºC, then unit keep original state.
- If the indoor coil temperature sensor is damaged or not connected, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

DEHUMIDIFICATION MODE

When unit is turned on in dehumidification mode:

- AUX1 is turned on. Ts is 24 ºC.
- If Tr ≥ 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA1 is 2VDC. Fan is turned on at low speed.
- If 16ºC ≤ Tr < 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA1 is 2.5VDC. Fan is turned on at low speed.
- If Tr < 16ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA1 is 3.5VDC.
- At the end of the above dehumidification cycle, the system will decide the next dehumidification control option.

AUTO MODE

When unit is turned on in Auto mode, fan is turned on at setting speed for 30S, then check Tr and Ts:

- If Ts>=Tr+3 ºC, the unit runs in heating mode.
- If Tr-3 ºC<Ts<Tr+3 ºC，the unit runs in fan mode.
- If Ts<Tr-3 ºC， the unit runs in cooling mode.
- If unit works in heating or fan mode, when Tr-Ts>3.0ºC, MTV2, MTV1 and DA1 is off for more than 10 minutes. EH is off for more than 10 minutes, the unit will work in cooling mode.
- If unit works in cooling or fan mode, when Ts-Tr>3.0ºC, MTV2, MTV1 and DA1 is off for more than 10 minutes. The unit will work in heating mode.

PRO INPUT FUNCTION

The unit is on:

- PRO input is closed for 60S, the unit is turned off.
- PRO input is open for 60S, the unit is turned on.

D.4. Control Logic For 4-Pipe System

Note: 4-pipe system must always be equipped with 2 valves.

COOL MODE

When unit is turned on in cooling mode.
If Tr ≥ Ts + 1ºC (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed. DA1 is turned on at 10 VDC for 2 minutes, then check Tr and Ts:

- DA1 output is from minimum (Modbus 300015 setting) ~10VDC based on Tr and Ts PID calculation.
- If Tr < Ts-1ºC (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA1 output is 0 VDC.
- When unit is turned off, MTV1 and AUX1 are off. DA1 is 0VDC. Fan is turned off delaying 30s.
- The range of Ts is 16 - 30ºC
- Indoor fan speed can be adjusted to low, medium, high and auto.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If Ti1 ≦ 2 ºC for 2 minutes

- MTV1 is turned OFF,
- DA1 is set to 0%,
- Indoor fan is turned on to Medium speed if fan runs at low speed.

If Ti1 ≧ 5ºC for 2 minutes

- MTV1 is turned ON,
- DA1 is set to original status,
- Indoor fan is changed to setting speed

FAN MODE

Indoor fan speed can be adjusted for low, medium and high. If fan speed is set auto by Modbus, fan is running at low speed.

HEAT MODE

Without Electrical Heater（Modbus300047=0）
When unit is turned on in heating mode.

When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV2 and AUX2 is turned on. DA2 is at 10VDC for 2 minutes, then check Ti2:

- If Ti2 < 28ºC (Modbus 300017 setting), fan is turned on at low speed. DA2 is at 10VDC.
- If 28ºC<Ti2< 28（Modbus 300017 setting）+4ºC, fan is on at original state. DA2 is at original state.
- If Ti2 ≥ 28（Modbus 300017 setting）+4ºC, fan is on at setting speed. DA2 output is from minimum (Modbus 300016 setting) ~10VDC based on Tr and Ts PID calculation.
- If Ti2 sensor is damaged, fan runs at setting speed.
- When Tr > Ts+1ºC (Modbus 300033 setting), MTV2 and AUX2 is turned off. DA2 is at 0VDC. Fan is turned on at lowest speed.
- When unit is turned off, MTV2 and AUX2 is turned off. DA2 is at 00VDC. Fan is turned off delaying 2 minutes.

With Electrical Heater as booster（Modbus300047=1）
When unit is turned on in heating mode.

When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV2 and AUX2 is turned on. Fan is turned on at setting speed. DA2 is at 10VDC for 2 minutes, then check Ti2:

- If Ti2 < 28ºC (Modbus 300017 setting), EH is turned on. DA2 is at 10VDC.
- If 28ºC<Ti2< 28（Modbus 300017 setting）+4ºC, EH is kept at original state. DA2 is at original state.
- If Ti2 ≥ 28（Modbus 3000017 setting）+4ºC, EH is turned off. DA2 output is from minimum (Modbus 300016 setting) ~10VDC based on Tr and Ts PID calculation.
- If Ti2 sensor is damaged, fan runs at setting speed.

- When Tr > Ts+1 ºC (Modbus 300033 setting) ºC, MTV2 and AUX2 is turned off. EH is turned off. DA2is at 0 VDC. Fan is turned on at low speed.
- When unit is turned off, MTV2 and AUX2 is turned off. DA2 is at 0VDC. Fan is turned off delaying 2 minutes.

OVER-HEAT PROTECTION OF INDOOR COIL

- If Ti2 ≥ 75ºC, then MTV2, AUX2, DA1 and EH are turned off. Indoor fan remains on and runs at high speed.
- If Ti2< 70ºC, then unit keep original state.
- If the indoor coil temperature sensor is damaged or not connected, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

DEHUMIDIFICATION MODE

When unit is turned on in dehumidification mode:

- AUX1 is turned on. Ts is 24 ºC.
- If Tr ≥ 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA1 is on at 3 times of (Modbus 300016 setting). Fan is turned on at low speed.
- If 16ºC ≤ Tr < 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA1 is on at double of (Modbus 300016 setting). Fan is turned on at low speed.
- If Tr < 16ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA1 is on at (Modbus 300016 setting). Fan is turned on at low speed.
- At the end of the above dehumidification cycle, the system will decide the next dehumidification control option.

AUTO MODE

When unit is turned on in Auto mode, fan is turned on at setting speed for 30S, then check Tr and Ts.

- If Ts>=Tr+3 ºC, the unit runs in heating mode.
- If Tr-3 ºC<Ts<Tr+3 ºC， the unit runs in fan mode.
- If Ts<Tr-3 ºC， the unit runs in cooling mode.
- If unit works in heating or fan mode, when Tr-Ts>3.0ºC, MTV2, MTV1 and DA1 is off for more than 10minutes. EH is off for more than 10 minutes, the unit will work in cooling mode.
- If unit works in cooling or fan mode, when Ts-Tr>3.0ºC, MTV2, MTV1 and DA1 is off for more than 10minutes. The unit will work in heating mode.

PRO INPUT FUNCTION

The unit is on:

- PRO input is closed for 60S, the unit is turned off.
- PRO input is open for 60S, the unit is turned on.

D.5. Sleep Mode

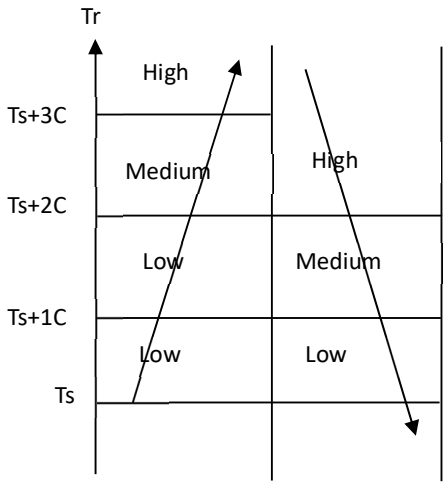
- SLEEP mode can only be set when the unit is in COOL or HEAT mode.
- In COOL mode, after SLEEP mode is set, the indoor fan will run at auto speed and Ts will increase by 0.5ºC each 30minutes. Maximum setting temperature increased is 3ºC.
- In HEAT mode, after SLEEP mode is set, the indoor fan will run at auto speed and Ts will decrease by 0.5 ºC each 30 minutes.
- Sleep mode is turned off, Setting temperature go back and Fan is changed to setting speed.

D.6. Auto Fan Speed

COOL MODE

Fan speed cannot change until it has run for more than 30 seconds.

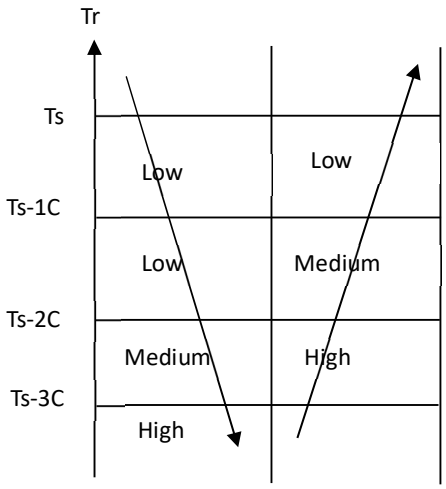
Fan speed is regulated according to the profile below.



HEAT MODE

Fan speed cannot change until it has run for more than 30 seconds.

Fan speed is regulated according to the profile below.



D.7. STEPPING MOTOR

For remote handset

Whenever the indoor fan is running, the louver can swing or stop at the desired position.

Louver angle: 0~100º, opens clockwise with widest angle at 100º.

Swing angle: 35~100º, opens clockwise to 68º. Below are the 4 fixed positions which can be set from wireless LCD handset.

Position	Angle
1	35º
2	57º
3	83º
4	100º

For wired wall pad

Louver angle: 0~100º, opens clockwise, with widest angle at 100º.

Swing angle: 35~100º, opens clockwise to 68º. User may stop louver at any desired position between 35~100º.

D.8. Buzzer

The unit will beep once when it receives 1 signal.

D.9. Auto Restart

The system uses non-volatile memory to save the present operation parameters when system is turned off or in case of system failure or cessation of power supply. Operation parameters are mode, set temperature and the fan speed. When power supply resumes or the system is switched on again, the same operations as previously set will function.

D.10. On/Off Switch On LED Display

- This is a tactics switch to select Cool→Heat→Off operation mode.
- In COOL mode, the set temperature of the system is 24 ºC with auto fan speed. There are no timer and sleep modes.
- In HEAT mode, the set temperature of the system is 24 ºC with auto fan speed. There are no timer and sleep modes.
- Master unit that does not use wall pad will globally broadcast.

Note: When button pressing is effective, the master unit buzzer will beep twice and the slave unit will beep once.

NOTE

When button pressing is effective, the master unit buzzer will beep twice and the slave unit will beep once.

D.11. Drain Pump

- Drain pump turns ON if the thermostat activates cooling or dehumidification. It remains on for at least 5 minutes after the thermostat reaches set point. During mode change from cooling or dehumidification to a different mode, the water pump will turn on for a minimum of 5 minutes.

> **CAUTION**
>
> *If the system is turned off at the circuit breaker (or main power supply), the drain pump will not work.*

D.12. Float Switch

Float-switch opens before unit is turned on

If float switch (N/C) is opened before the unit is turned on, If in Cool Mode MV1DA1 will be off/0%. Drain pump and indoor fan will operate. After float switch is closed, MTV1/COOL is on.

Float switch is opened, when unit is on

If float switch is opened continuously ≧5sec, drain pump will work and If in Cool Mode MV1 will be off/0%. When the float switch is closed, the drain pump will run for additional 5 minutes. If the float switch is opened for 10 minutes continuously, MV1 will remain off. Indoor fan runs at set speed and system report error.

Float switch is opened, when unit is off

If the float switch is opened, the drain pump will work. After the float switch is closed, the drain pump will run for an additional 5 minutes. If the float switch is opened for 10 minutes continuously, the system reports an error.

D.13. Electric Heater Safety Switch

- Before the electrical heater is turned on, the EH safety switch must be closed, EH is open for 3 minutes and EC motor RPM must be more than MODBUS300020 setting
- When electrical heater is ON, electrical heater safety switch is opened for ≥ 1 second or EC motor RPM is lower than Modbus 300020 setting, EH will be turned off immediately and report an error and fan speed is changed to high speed.
- Once the contact is returned to the closed ≥ 180 seconds and EC motor RPM must be more than MODBUS300020 setting, reset the error and the heater will start again.
- When the EH safety switch is opened ≥ 3 times within 60 minutes the heater is not allowed to start anymore.
- Turn off the unit to reset the fault, provided that the switch has returned to the closed position.

D.14. Low Temperature Protection of Indoor Coil in Winter

This is frost protection for when the unit is off to prevent water in the coil and room from freezing.

If 2pipe unit is in Standby Mode

If Tr ≦ 2 ºC for 2 minutes

- MTV1 is turned on.
- AUX2 is closed.
- DA1 is 5 VDC.
- If Ti1 <5 ºC for 2 minutes EH (if present) is switched on.
- Indoor fan is turned on at low speed.

If Tr ≧ 5ºC for 2 minutes

- MTV2 is off.
- AUX2 is open.
- DA1 is set to 0 VDC.
- Electric Heater is turned off.
- Indoor fan is switched off.

If 4-pipe unit is in Standby Mode

If Tr ≦ 2 ºC for 2 minutes

- MTV2is turned on.
- AUX2 is closed.

- DA2 is 5VDC. If unit with 6-way valve, DA1 is 8 VDC.
- If Ti1 < 5 ºC for 2 minutes EH (if present) is switched on.
- Indoor fan is turned on at low speed.

If Tr ≧ 5ºC for 2 minutes

- MTV2 is off.
- AUX2 is open.
- DA2 is set to 0. If unit with 6-way valve, DA1 is 5 VDC.
- Electric Heater is turned off.
- Indoor fan is switched off.

D.15. Open Modbus protocol

Transfer Mode: RTU, BAUD Rate: 9600bps, 8 data bit, 1 stop bit, none parity bit

The communications require a delay of 80ms between reading an answer and sending the next command. All temperatures are equal to reading data*10 accuracy: 0.1 degree C.

Supported Functions:

Function Code	Function Description
01(01H)	Read Coils
02(02H)	Read Discrete Inputs
03(03H)	Read Holding Registers
04(04H)	Read Input Registers
05(05H)	Write Single Coil
06(06H)	Write Single Register
15(0FH)	Write Multiple Coils
16(10H)	Write Multiple Registers
255(FFH)	Extended Commands which are used to test unit

Valid Error code table:

Error code	Description	Definition
01 (01H)	Invalid commands	Received commands beyond valid commands
02 (02H)	Invalid data address	Data addresses beyond valid data address
03 (03H)	Invalid data	Data beyond definition range
04 (04H)	Write data not successful	Write data did not succeed

Coils table:

Description	Address	Type*	Remark
ON/OFF	100000	R/W	0=Off, 1=On;
Sleeping mode	100001	R/W	0=Off, 1=On;
Louver swings	100002	R/W	0=Off, 1=On;
Energy Saving Mode	100003	R/W	0=Off, 1=On;
PRO control logic	100004	R/W	0=On/off function; 1=RCS function; Default: 0

Discrete table:

Description	Address	Type*	Remark
MTV1	200000	R	
MTV2	200001	R	
AUX1	200002	R	
AUX2	200003	R	
Condensate pump	200004	R	
Electrical heater	200005	R	
Wired wall pad	200006	R	
PR-O1	200007	R	
Float switch	200008	R	
Reserved	200009	R	
EH safety switch	200010	R	
Internal test	200011	R	Testing purpose only.

* R = read only, W = write only, R/W = read and write.

Holding Register table:

Description	Address	Type*	Remark
Mode setting	300000	R/W	Cooling mode = 01(H) Humidify mode = 02(H) Fan mode = 04(H) Heating mode = 08(H) Auto mode = 10(H)
Fan speed setting	300001	R/W	Low speed = 04(H) Medium speed = 02(H) High speed = 01(H) Auto fan speed = 07(H)
Louver swing setting	300002	R/W	Position 1=01(H)
			Position2=02(H)
			Position3=03(H)
			Position4=04(H)
			Auto=0F(H)
			Stop=00(H)
Setting temperature	300003	R/W	16~30 (actual*10 format)
Address setting	300004	R/W	1~255
Reset	300005	W	=0x33 reset error
Week	300006	W	
Hour	300007	W	
Minute	300008	W	
Second	300009	W	
Hours in Timer on	300010	R/W	Timer ON
Minute in Timer on	300011	R/W	Timer ON
Hours in Timer off	300012	R/W	Timer OFF
Minute in Timer off	300013	R/W	Timer OFF
Icon of Timer ON or OFF	300014	R/W	BIT0 = Icon of Timer ON BIT1 = Icon of Timer OFF 1 = enable 0 = disable
Minimum output DA1	300015	R/W	Default 25% (2.5VDC)
Minimum output DA1	300016	R/W	Default 25% (2.5VDC)
Pre-heat temperature setting	300017	R/W	25~35, default: 30
Reserved-	300018	R/W	Default: 40% (4VDC) or (10.4mA)
Super low speed rpm	300019	R/W	0~10V, default:2VDC
Low speed rpm	300020	R/W	1~10VDC, default: 3VDC
Medium speed rpm	300021	R/W	1~10VDC, default: 6VDC
High speed rpm	300022	R/W	1~10VDC, default: 8.5VDC
Signal output setting	300023	R/W	1~10VDC (used to test，0 = disable)
Temperature sampling time	300024	R/W	2~100, default: 5S
Factor of auto fan speed	300025	R/W	2~150, default:20
Factor of modulating valve	300026	R/W	2~250, default:150
Ti1 and Ti2 Cooling difference setting	300027	R/W	3~15, default:5
Ti1 and Ti2 Heating difference setting	300028	R/W	3~15 default:5
Controller Hardware type setting	300029	R/W	0=air cleaner (S5) **1=FCU (S1/S2/S3, SWC-S)** 2=AHU (S6) or (AHU+W5) 3=AHU+AQI (S5+S6) 4=Zone controller(S7) Setting**: 1**
Degree unit setting	300030	R/W	0=degree C 1=degree F
Temperature display setting	300031	R/W	0=Room temperature display on LED 1=Setting temperature display on LED
Setting temperature range	300032	R/W	0=setting temperature range is from 16~30 1=Setting temperature range is fixed. Cooling=24oC Heating=21oC
Temperature band setting	300033	R/W	1~9, default:1

Reserved	300034	R/W	
Reserved	300035	R/W	
Reserved	300036	R/W	
Reserved	300037	R/W	
Reserved	300038	R/W	
Reserved	300039	R/W	
Reserved	300040	R/W	
Reserved	300041	R/W	
Reserved	300042	R/W	
Reserved	300043	W	
Reserved	300044	W	
Reserved	300045	W	
Software type	300046	R/W	0=2-pipe+MTV 1=2-pipe without valve 2=4-pipe+std valve 3=4-pipe+6-way valve
EH type	300047	R/W	0=without EH, 1=EH as booster; 2=EH as primary
DA1 control signal	300048	R/W	0=Tr/Ts 1=ESP
EC motor input ports	3000049	R/W	0=CN4 working 1=CN5 working 2=CN4+CN5 working default：0
PRO1 input type	300050	R/W	0=NO 1=NC
Tr sensor setting	300051	R/W	0=sensor on the wired wall pad 1=sensor on the main PCB, default：0
Reserved	300052	R/W	
Optimized swing angle	300053	R/W	200~999 default: 0
E-heater	300054	R/W	Unit：KW*10
Room temp. factor	300055	R/W	90~120, default: 103
Water inlet temp. factor	300056	R/W	90~120, default: 103
Delta T factor	300057	R/W	90~120, default: 102
Product type	300058	R/W	00~99; default: 00
Product model	300059	R/W	000~999; default: 000
Ex-works data	300060	R/W	0000——9999
Software version	300061	R	10~99 default: 10
Hardware version	300062	R	10~99 default: 10
Reserved	300063	R/W	
Reserved	300064	R/W	
Reserved	300065	R/W	
Reserved	300066	R/W	
Reserved	300067	R/W	
In auto mode, temp. Band setting	300068	R/W	1~15, default:3
Reserved	300069	R/W	
Reserved	300070	R/W	
Unit power input at High speed	300071	R/W	W*10
Unit power input at Med. speed	300072	R/W	W*10
Unit power input at Low speed	300073	R/W	W*10
Unit heat capacity at High speed	300074	R/W	KW*10
Unit heat capacity at Med. speed	300075	R/W	KW*10
Unit heat capacity at Low speed	300076	R/W	KW*10
Unit cool capacity at High speed	300077	R/W	KW*10
Unit cool capacity at Med. speed	300078	R/W	KW*10
Unit cool capacity at Low speed	300079	R/W	KW*10

* R = read only, W = write only, R/W = read and write.

Input Register table:

Description	Address	Type*	Remark
Tr temperature sensor	400000	R	
Ti1 temperature sensor	400001	R	
Ti2 temperature sensor	400002	R	
Reserved	400003	R	
Reserved	400004	R	
Error code	400005	R	Bit0 = Room temperature sensor error Bit1 = Ti1 temperature sensor error Bit2 = Ti2 temperature sensor error Bit3 = Float switch error Bit4 = Indoor coil low temperature protection Bit5 = Indoor coil overheat protection Bit6 =Filter switch Bit7 = Electrical heater failure Bit8 = Motor1 Error Bit9 =Motor2 Error Bit10 = System parameters error Bit11 = Anti-frozen error Bit12 = Ti3 temperature sensor error Bit13 = Ti4 temperature sensor error Bit14 =PM2.5 sensor Bit15 =AQI Error
Fan speed status	400006	R	Low = 04(H) Medium = 02(H) High = 01(H)
Reserved	400007	R	
Reserved	400008	R	
EH	400009	R	0= disable, 1=booster, 2=primary
Unit type	400010	R	
DA1	400011	R	
DA1	400012	R	
Reserved	400013	R	
Reserved	**400014**	**R**	
Reserved	**400015**	**R**	
Reserved	**400016**	**R**	
Unit status	**400017**	**R**	Cooling mode = 01(H) Humidify mode = 02(H) Fan mode = 04(H) Heating mode = 08(H) Unit OFF=32(H)
Temperature in wall pad	**400018**	**R**	
Motor running time	**400019**	**R**	
Motor running terms	**400020**	**R**	0~100
Cooling capacity	**400021**	**R**	
Cooling capacity terms	**400022**	**R**	0~100
Heating capacity	**400023**	**R**	
Heat capacity terms	**400024**	**R**	0~100
Reserved	400025	R	
Reserved	400026	R	
Reserved	400027	R	
Reserved	400028	R	
Reserved	400029	R	
Reserved	400030	R	

D.16. Network Setup

1) Disconnect the communication plug from the control box

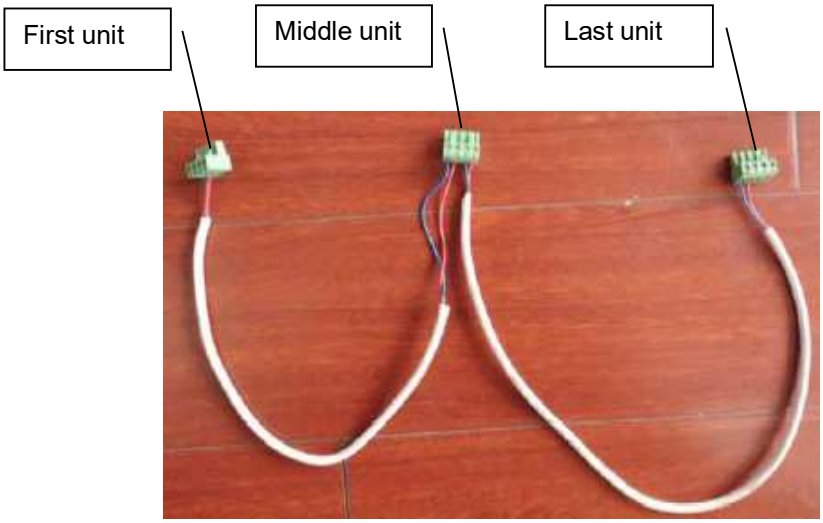
2) Communication plug

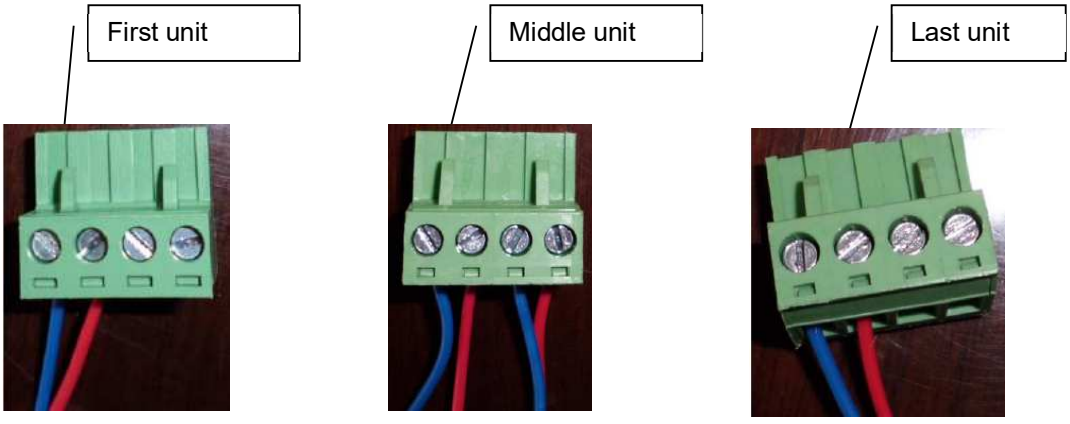
A, B, A, B is printed on the main PCB. When you connect the wires, please ensure connection of A to A and B to B.

3) Connection wire

3.1) If the total length of wire is more than 1000m, please use shielded wire in order to protect the signal transmission.

3.2) Complete wire connection

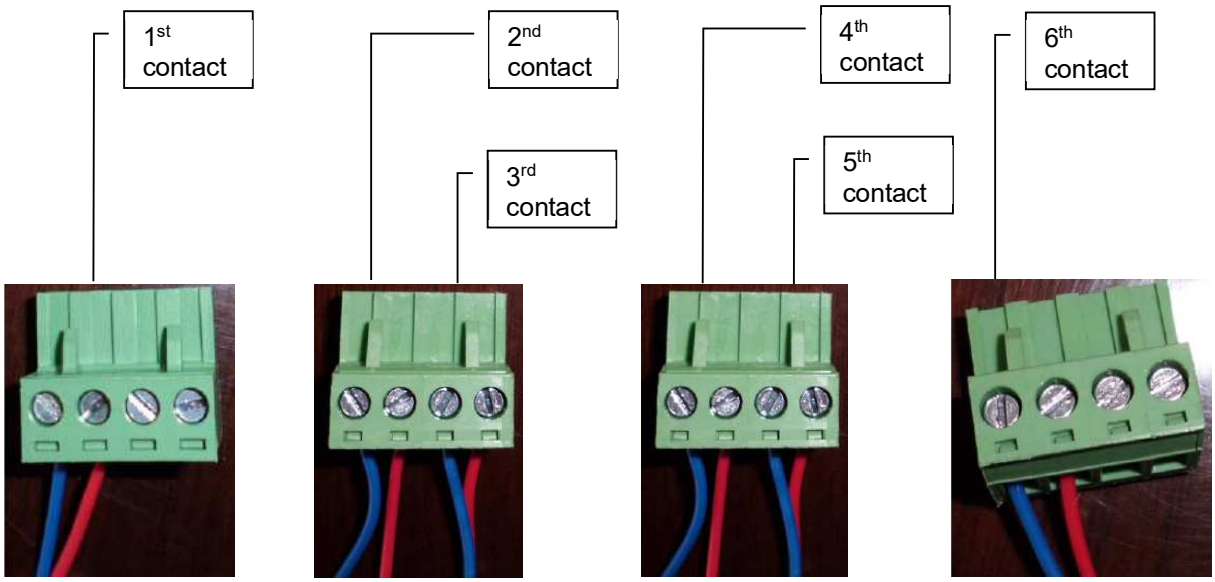




3.3) Wire connection check

3.3.1) After the wire connection is completed, please check that the wire colours correspond.

3.3.2) Check the wire contact by using a multimeter.



3.3.3) Check 1 and 2, 3 and 4, 5 and 6 to be sure connections are correct.

3.3.4) If the resistance between two wire contacts is too high, please check and reconnect the wire contacts.

4) Reconnect the communication plug to control box

5) Use wired wall pad or Modbus to set each unit address.

D.17. LED Display and Error Description

Complete Function PCB – I Control Type		
Fan speed setting	LED indication	Condition
High speed	Red LED On	Normal
Medium speed	Yellow LED On	Normal
Low speed	Green LED On	Normal

For all units - Green LED			
Error Description	Blink	Reason	Remedy
Return air sensor failure	Green LED blinks 1 times, stops for 3s	Room sensor unplugged or damaged.	1. Check if Tr plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil sensor 1 failure	Green LED blinks 2 times, stops for 3s	Ti1 sensor unplugged or damaged.	1. Check if Ti1 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil sensor 2 failure	Green LED blinks 3 times, stops for 3s	Ti2 sensor unplugged or damaged.	1. Check if Ti2 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Water pump failure	Green LED blinks 4 times, stops for 3s	Float switch is opened.	1. Check if the condensate water pipe is connected or not. 2. Check if the pump is functioning or not.
Indoor coil low temperature protection	Green LED blinks 5 times, stops for 3s	Water temperature is lower than 3 ºC.	Check the water temperature.
Indoor coil overheat protection	Green LED blinks 6 times, stops for 3s	Water temperature is higher than 70 ºC.	Check the water temperature.
Filter Switch (S6 PCB)	Green LED blinks 7 times, stops for 3s	Filter switch is opened.	1. Check if filter block or not. 2. replace the new filter
Electric Heater failure	Green LED blinks 8 times, stops for 3s	Only for unit with EH. EH safety switch is opened.	1. Change fan speed to high. 2. Replace the damaged EH safety switch.
EC motor failure (CN4)	Green LED blinks 9 times, stops 3s	No EC motor feedback	1. Check Modbus setting. 2. Check the EC motor.
EC motor failure (CN5)	Green LED blinks 10 times, stops 3s	No EC motor feedback	1. Check Modbus setting. 2. Check the EC motor.
Anti-frozen protection	Green LED blinks 12 times, stops for 3s	When unit is standby, Tr<2ºC.	1. Turn on unit to keep Tr high than 5ºC.

E. Control Specifications: Flexible Function (W Type)

E.1. Features

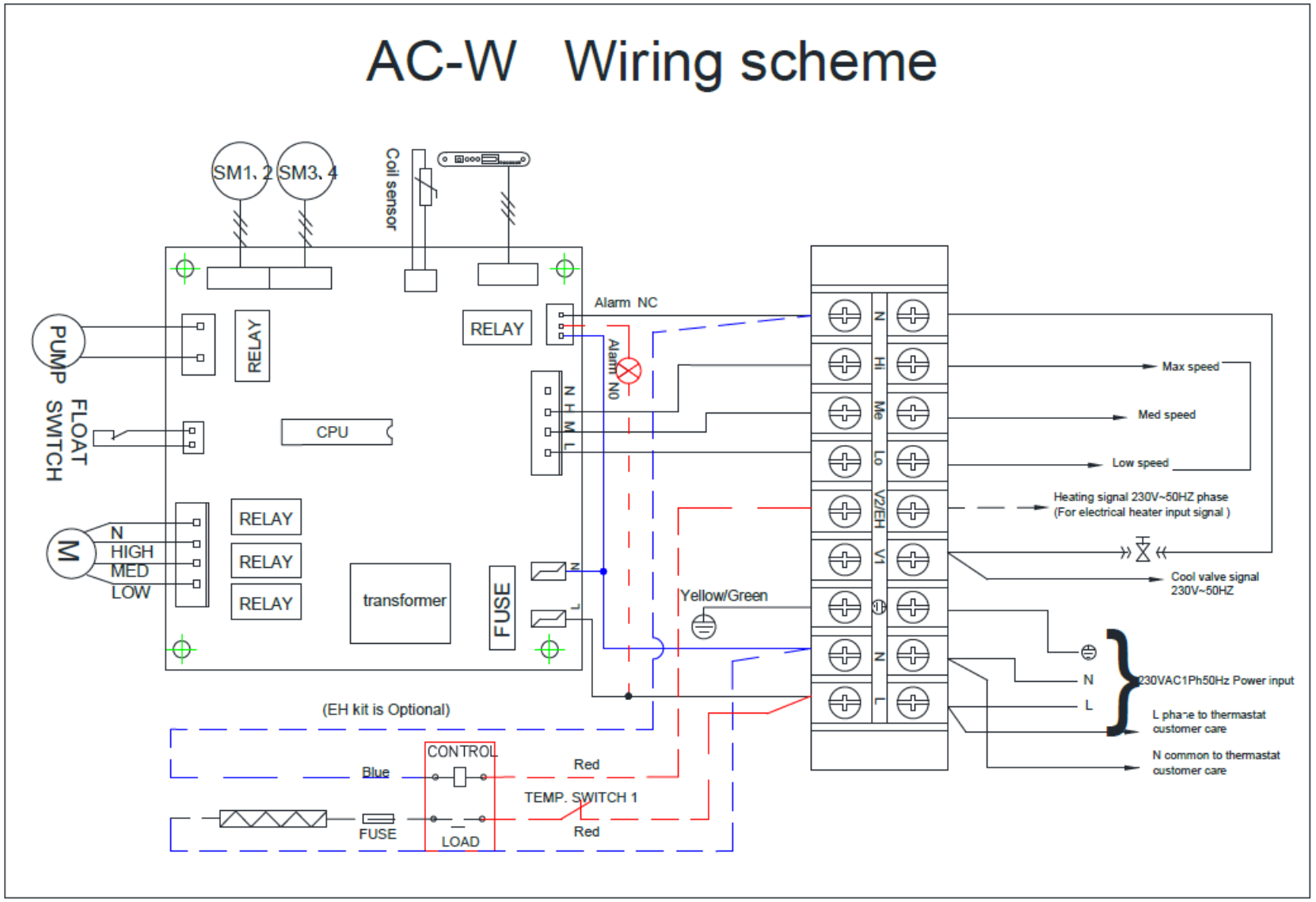
a. Condensate management with valve protection and NC alarm contact.
b. Integrated fan relays for zone control applications.
c. Simple error diagnostic and LED error display.

E.2. I/O Port Definitions

I/O		Code	2-Pipe	4-Pipe
Analogue input	Coil temperature sensor	AI	Cooling / heating coil sensor (Ti1)	Cooling only coil sensor (Ti1)
Voltage input	High fan speed	H	230VAC input signals from wired thermostat.	
	Medium fan speed	M		
	Low fan speed	L		
Voltage input	Phase	L	External 230VAC power supply connection to the PCB.	
	Neutral	N		
	Earth	⏚		
Digital input	Float switch	Float	Voltage-free (NC).	
Voltage output	Water pump	PUMP	Voltage output (L).	
Voltage output	High fan speed	H	230VAC outputs for 3-speed AC fan motor.	
	Medium fan speed	M		
	Low fan speed	L		
	Neutral	N		
	Stepping motor	CN1-2	Power supply to louver stepping motors Voltage output (L)	
Digital output	LED display	X-DIS	Digital communication port to LED display.	
Voltage-free output	Alarm	ALARM	Voltage-free alarm contact: (a) Standard configuration is (NC). (b) Optional field-wired configuration is (NO).	

E.3. Wiring Diagrams

E.3.1. Flexible Function PCB - W Type Control



E.4. Control Logic Specifications

E.4.1. Unit Power ON/OFF

- The unit is turned ON when any of the fan speed inputs (from thermostat) are ON.
- The unit is turned OFF only if all of the fan speed inputs (from thermostat) are OFF.

E.4.2. Alarm Protection and Error Display

- If the float switch is open for 5 minutes, then the (NC) voltage-free alarm contact shall be open and the (NO) voltage free alarm contact shall be closed.
- If the float switch is open for 10 minutes, the LED display reports a condensate management failure (see table on the next page).

E.4.3. Drain Pump Operation

a) When the unit turns ON:

- If Ti1 < 14 ºC, the drain pump turns ON.
- If 14 ºC≦Ti<16ºC, the drain pump keeps original state.
- If Ti1 ≥ 16ºC, the drain pump turns OFF.

b) When the unit turns OFF and the drain pump is ON:

- The drain pump will remain ON for 5 minutes, and then turn OFF.

c) At any time:

- If the float switch is OPEN, the drain pump will turn ON.
- If the float switch is OPEN and then CLOSES, the drain pump will remain ON for 5 minutes, and then turn OFF.

E.4.4. Low Temperature Protection of Indoor Coil in Winter

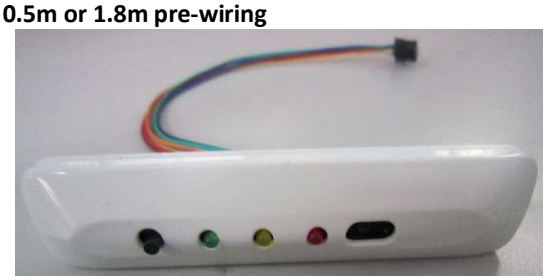
This is frost protection for when the unit is off to prevent water in the coil and room from freezing.

Unit is in Standby Mode

If Ti1≦ 2 ºC for 2 minutes, report error code and Buzzer is beeping for 3 minutes.

E.5. LED Display and Error Description

LED receiver in ABS housing with 0.5m or 1.8m pre-wiring

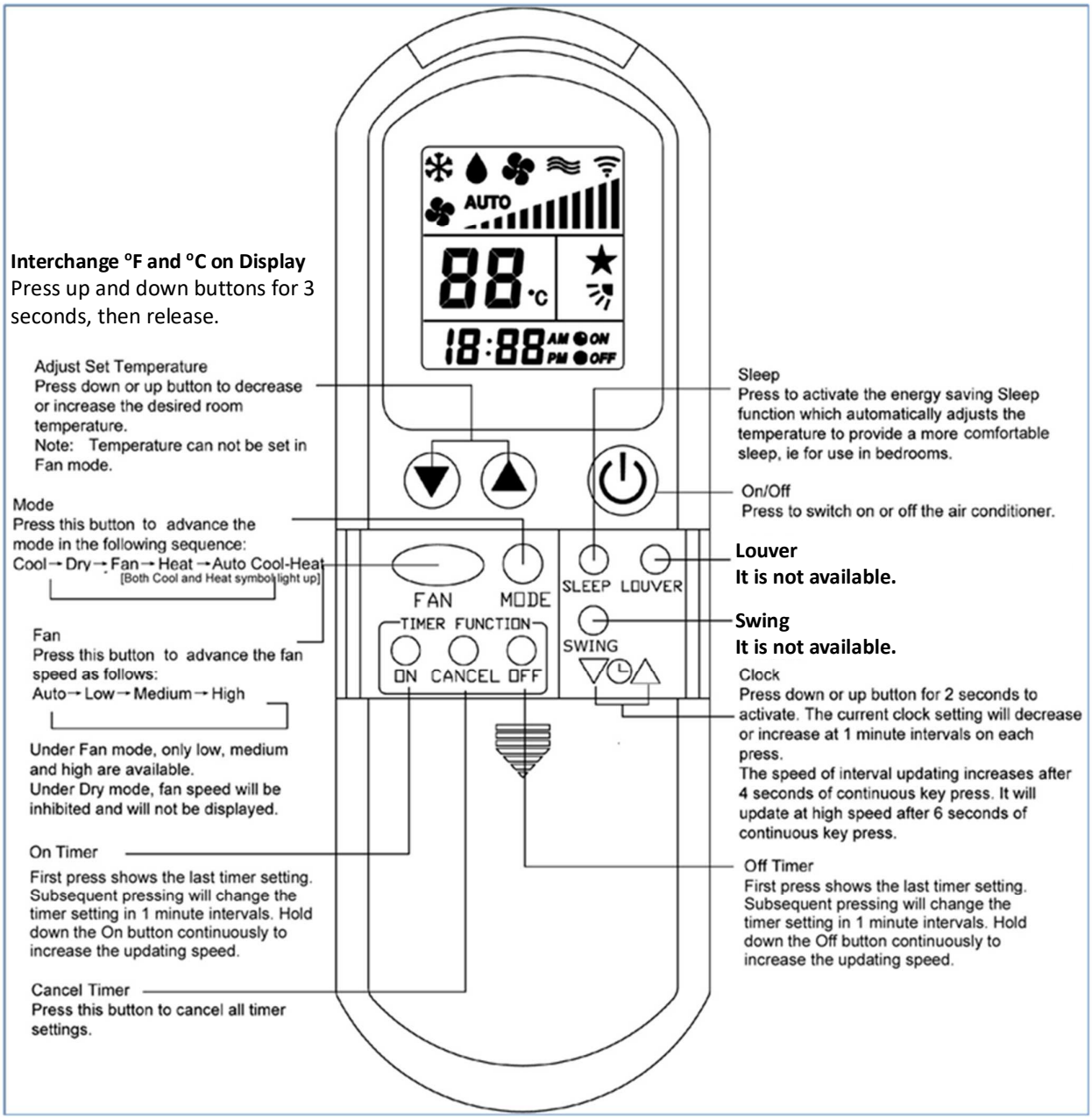


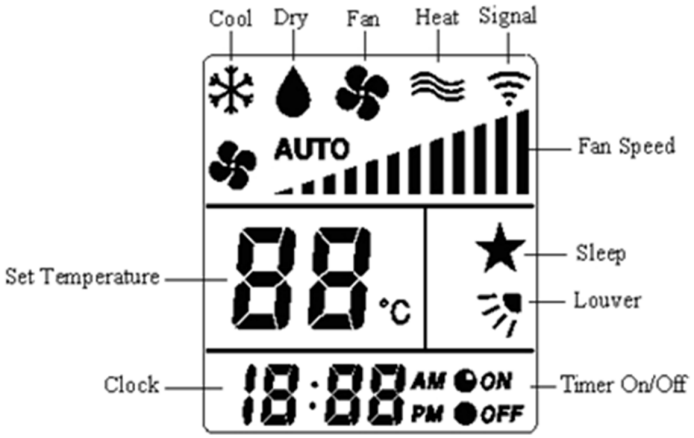
Flexible Function PCB - W Control Type		
Fan speed setting	**LED indication**	**Condition**
High speed	Red LED On	Normal
Medial speed	Yellow LED On	Normal
Low speed	Green LED On	Normal

Error Description	**LED status**			
	Red	**Yellow**	**Green**	**Remedy**
Coil temperature sensor failure	On	Blink	Blink	1. Check if Ti1 sensor plug is connected or not. 2. Check if sensor's resistor is correct or not.
Water pump failure	Blink	Blink	Blink	1. Check if the condensate water pipe is connected or not. 2. Check if the pump is functioning or not.
Anti-frozen protection	On	On	Blink	1. Turn on unit to keep Ti1 higher than 5ºC.

F. User Interface

F.1. Remote Handset





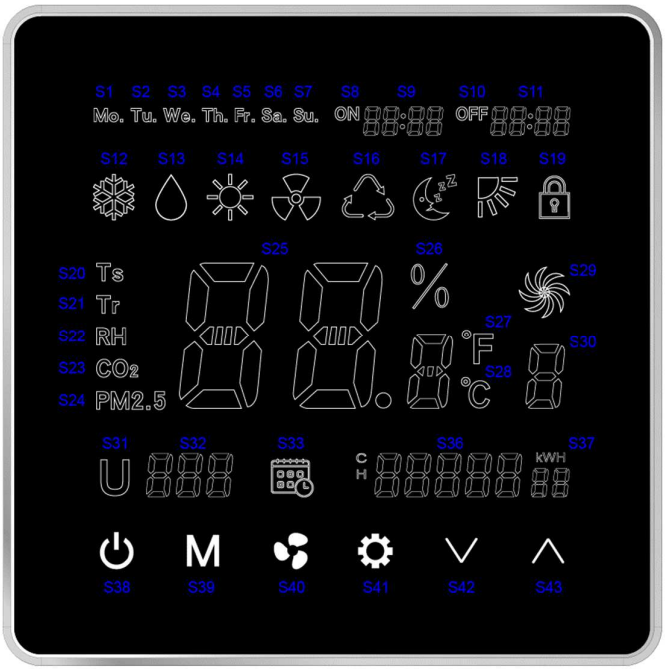
Attention

When unit with handset is the master unit, its settings are automatically sent to the slave units; Auto Cool-Heat operation will be applicable in 4-pipe system only.

Swing" & "Louver" functions are not applicable.
European version only uses degree C setting.

F.2. Wired Wall Pad Controller

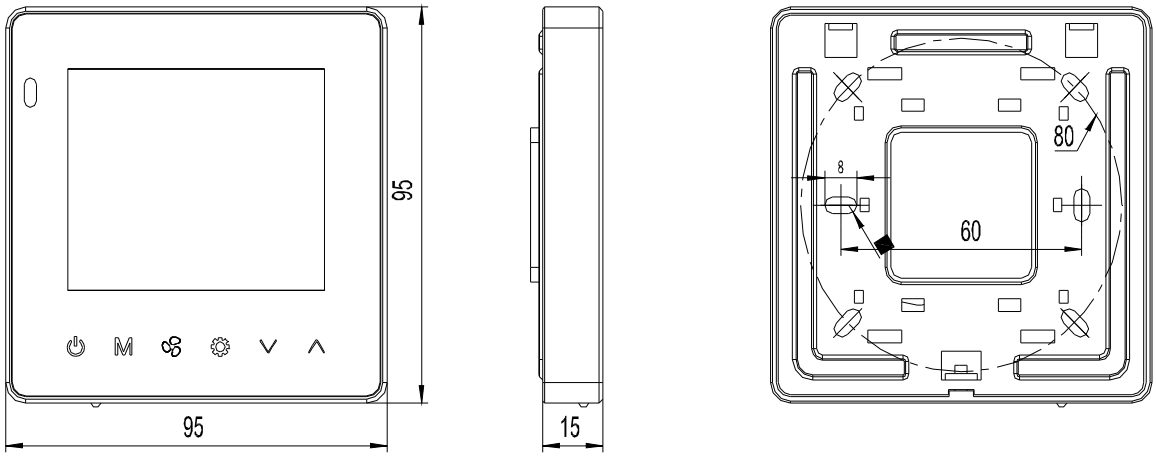
F.2.1. LED display



Code	Legend	Code	Legend	Code	Legend
S1	Monday	S16	Auto Mode	S31	Unit address
S2	Tuesday	S17	Sleep mode	S32	Unit No. / Error code
S3	Wednesday	S18	Swing mode	S33	Weekly timer
S4	Thursday	S19	LED lock	S34	C-cooling
S5	Friday	S20	Setting Temperature	S35	H-heating
S6	Saturday	S21	Room Temperature	S36	Energy consumption
S7	Sunday	S22	RH (if need)	S37	Energy consumption cycle
S8	Timer-ON	S23	CO2 density (if need)	S38	On/Off Button
S9	Timer-ON time (When Timer-ON is off: Current time)	S24	PM2.5 density (if need)	S39	Mode setting

S10	Timer-OFF	S25	Data Display	S38	On/Off Button
S11	Timer-OFF time	S26	RH percentage	S39	Mode setting
S12	Cooling Mode	S27	Fahrenheit degree	S40	Fan speed setting
S13	Dehumidification	S28	Celsius degree	S41	Parameter setting
S14	Heating Mode	S29	Fan	S42	Up
S15	Ventilation Mode	S30	0-Auto. 1-Low. 2-Medium. 3-High	S43	Down

F.2.2. Dimensions



F.2.3. Buttons and function

S38	On/OFF Button	Press to turn on. Press it again to turn off.
S39	Mode button	With wall pad on, press M to select Cooling, Dehumidification, Heating, Ventilation or Auto sequentially.or Auto sequentially.
S40	Fan Speed Button	Press S30 to change from 0 to3. 0=Auto speed, 1=Low speed, 2=Medium speed, 3=High speed.
S41	Parameter Setting Button	Long press for 5 seconds to set today's day of week. Press ∨ or ∧ to change from Monday to Sunday.
		Long press for 5 seconds then short press it once to set current time. Press ∨ or ∧ to change current time.
		Long press for 5 seconds then short press it twice to set Timer ON. Press M to set day of week from Monday to Sunday. Press ∨ or ∧ to change Timer ON time. Press to turn Timer ON on or off and S8 appears or disappears.

	Long press for 5 seconds then short press it 3 times to set Timer OFF time. Press to set day of week from Monday to Sunday. Press or to change Timer OFF time. Press to turn Timer OFF on or off and S10 appears or disappears.
	Long press for 5 seconds then short press it 4 times to set group control and U31 appears. The function is reserved.
	Long press for 5 seconds then short press it 5 times to set unit address and U32 appears. Press or to change unit address.
***** For MODBUS user only**	Long press for 5 seconds then short press it 6 times to set unit parameters. Press to change the parameter type. Press or to change parameter setting value. S31/S32 displays “U001”, which is used to set unit type. 0=iAIR …… Mode: Ventilation T, RH, CO2, PM2.5 are displayed. 1=iFCU …… Mode: S12, S13, S14, S15, S16, S21 or S20 is displayed. 2=iAHU …… Mode: S12, S13, S14, S15, S16, S21 or S20 is displayed. 3=iAHU with air cleaner …… Mode: S12, S13, S14, S15, S16, T, RH, CO2, PM2.5 are displayed. S31/S32 displays “U002”, which is used to set unit of temperature degree. 0=Celsius degree. 1=Fahrenheit degree. S31/S32 displays “U003”, which is used to select display temperature on LCD. 1=Setting temperature. 0=Room temperature. S31/S32 displays “U004”, which is used to set setting temperature range. 0=Setting temperature is from 16~30°C. 1=Cooling setting temperature 24°C, Heating setting temperature 21°C. S31/S32 displays “U005”, which is used to set setting temperature band. 1~9°C. S31/S32 displays “U006-U009”, which are reserved to set parameters with optional accessory to measure PM2.5 and CO2 values. S31/S32 displays “U010~U011”, which are reserved. S31/S32 displays “U012”, which is used to set setting RH point. 30~70, default: 50 S31/S32 displays “U013”, which is used to set setting RH band. 10~30, default: 10 S31/S32 displays “U014”, which is used to set unit address. 1~255, default: 1 S31/S32 displays “U015”,which is used to set unit ESP. 0~100%, default: 40%， S31/S32 displays “U016”, which is reserved.

		S31/S32 displays“U017”, which is used to set software. (please refer to different PCB) 0=2-pipe with valve 1=2-pipe without valve 2=4-pipe with std valve 3=4-pipe with 6-way valve S31/S32 displays “U018”, which is reserved. S31/S32 displays “U019”, which is used to set DA1 function When U001=2,3 U019=0, fan control signal is based on Tr, Ts PID calculation U019=1, fan control signal is based on ESP PID calculation S31/S32 displays “U020”, which is used to calibrate the sensor on the wired wall pad. -5~5, default: -3 S31/S32 displays “U021”, which is used to set EH function U021= 0, without EH. U021= 1, EH as booster. U021=2, EH as primary. S31/S32 displays “U022”, which is used to select Tr sensor. 0=the sensor in the WWP. 1=the sensor in the PCB. S31/S32 displays “U023”, which is used to display cooling and heating energy consumption. 0=S34/S35/S36/S37 disappears 1=S34/S35/S36/S37 appears In cooling and dehumidification mode, cooling energy consumption is shown. In heating mode, heating energy consumption is shown. 2=Motor running time is shown. S31/S32 displays “U024”, which is used to set low speed RPM or control signal. S31/S32 displays “U025”, which is used to set medium speed RPM or control signal. S31/S32 displays “U026”, which is used to set high speed RPM or control signal. S31/S32 displays “U027”, which is used to set Delta T OF Ti1/Ti2. S31/S32 displays “U028”, which is used to set Delta T OF Ti3/Ti4. S31/S32 displays “U029”, which is used to read unit type. S31/S32 displays “U030”, which is used to read unit model. S31/S32 displays “U031”, which is used to read unit manufacturing date.
S32	Error code	S32：E** blinks Bit0 = Room temperature sensor error Bit1 = Ti1 temperature sensor error Bit2 = Ti2 temperature sensor error Bit3 = Float switch error Bit4 = Indoor coil low temperature protection Bit5 = Indoor coil overheat protection Bit6 =Filter switch Bit7 = Electrical heater failure Bit8 = Motor1 Error Bit9 =Motor2 Error

		Bit10 = System parameters error Bit11 = Anti-frozen error Bit12 = Ti3 temperature sensor error Bit13 = Ti4 temperature sensor error Bit14 =PM2.5 sensor Bit15 =AQI Error
Combination Button Function		Screen Lock Function Long press ^ for 5 seconds, S19 appears and screen is locked. Long press ^ for 5 seconds again, S19 disappears and screen is unlocked.
		Swings Function Long press v for 5 seconds, S18 appears and swings is ON. Long press v for 5 seconds again, S18 disappears and swings is OFF.
		Sleep Mode Long press for 5 seconds, S17 appears and sleep mode is ON. Long press for 5 seconds again, S17 disappears and sleep mode is OFF.

F.2.4. Error code

Error Description	Code	Reason	Remedy
Room temperature sensor error	E1	Room sensor unplugged or damaged.	1. Check if Tr plug is connected or not.
			2. Check if sensor's resistance is correct or not.
Indoor coil sensor 1 failure	E2	Ti1 sensor unplugged or damaged.	1. Check if Ti1 plug is connected or not.
			2. Check if sensor's resistance is correct or not.
Indoor coil sensor 2 failure	E3	Ti2 sensor unplugged or damaged.	1. Check if Ti2 plug is connected or not.
			2. Check if sensor's resistance is correct or not.
Float switch error	E4	Float switch is opened.	1. Check if the condensate water pipe is connected or not.
			2. Check if the pump is functioning or not.
Indoor coil low temperature protection	E5	Water temperature is lower than 3 ºC.	Check the water temperature.
Indoor coil overheat protection	E6	Water temperature is higher than 70 ºC.	Check the water temperature
Filter switch protection	E7	Filter Switch is open.	Replace or clean filter.
Electric Heater failure	E8	Only for unit with EH.	1. Change fan speed to high.
		EH safety switch is opened.	2. Replace the damaged EH safety switch.
Motor qty setting error (S6 PCB)	E11	Motor Qty setting error	1: check Modbus setting.
Anti-frozen protection	E12	When unit is standby, Tr<2ºC.	1. Turn on unit to keep Tr high than 5ºC.
Indoor coil sensor 3 failure (S6 PCB)	E13	Ti3 sensor unplugged or damaged.	1. Check if Ti3 plug is connected or not.
			2. Check if sensor's resistance is correct or not.
Indoor coil sensor 4 failure (S6 PCB)	E14	Ti4 sensor unplugged or damaged.	1. Check if Ti4 plug is connected or not.
			2. Check if sensor's resistance is correct or not.
PM2.5 sensor failure (S6 PCB)	E15	PM2.5 sensor unplugged or damaged.	1. Check if PM2.5 plug is connected or not.
			2. Check if sensor's resistance is correct or not.
AQI sensor failure (S6 PCB)	E16	AQI sensor unplugged or damaged.	1. Check if AQI plug is connected or not.
			2. Check if sensor's resistance is correct or not.
Wired Wall Pad failure	E17	WWP unplugged or not well	1. Check plugs

G. Sensor Resistance R-T Conversion Table

Resistance: R (25°C) = 10KΩ ± 1% Beta Constant: B (25/85) = 3950 ± 1%

Temp. (deg. C)	Rmax (k Ohms)	Rnor (k Ohms)	Rmin (k Ohms)	Temp. (deg. C)	Rmax (k Ohms)	Rnor (k Ohms)	Rmin (k Ohms)
-30	186.3613	179.2666	172.4247	5	25.9521	25.4562	24.9672
-29	174.9608	168.4053	162.0793	6	24.6872	24.2274	23.7738
-28	164.3317	158.2726	152.4218	7	23.4912	23.0650	22.6443
-27	154.4170	148.8151	143.4022	8	22.3599	21.9650	21.5750
-26	145.1643	139.9837	134.9746	9	21.2897	20.9239	20.5622
-25	136.5254	131.7332	127.0964	10	20.2768	19.9380	19.6028
-24	128.4558	124.0216	119.7285	11	19.3178	19.0041	18.6937
-23	120.9146	116.8107	112.8348	12	18.4096	18.1193	17.8318
-22	113.8640	110.0648	106.3818	13	17.5493	17.2807	17.0146
-21	107.2691	103.7512	100.3387	14	16.7340	16.4857	16.2394
-20	101.0977	97.8396	94.6771	15	15.9612	15.7317	15.5040
-19	95.3201	92.3020	89.3705	16	15.2284	15.0164	14.8059
-18	89.9088	87.1124	84.3946	17	14.5333	14.3376	14.1432
-17	84.8385	82.2471	79.7268	18	13.8738	13.6933	13.5139
-16	80.0856	77.6837	75.3463	19	13.2479	13.0816	12.9160
-15	75.6284	73.4018	71.2336	20	12.6537	12.5005	12.3479
-14	71.4468	69.3823	67.3708	21	12.0895	11.9485	11.8080
-13	67.5220	65.6077	63.7412	22	11.5535	11.4239	11.2946
-12	63.8370	62.0616	60.3295	23	11.0442	10.9252	10.8064
-11	60.3755	58.7288	57.1212	24	10.5602	10.4510	10.3419
-10	57.1228	55.5953	54.1032	25	10.1000	10.0000	9.9000
-9	54.0651	52.6480	51.2629	26	9.6709	9.5709	9.4710
-8	51.1895	49.8747	48.5889	27	9.2623	9.1626	9.0630
-7	48.4842	47.2643	46.0705	28	8.8732	8.7738	8.6747
-6	45.9381	44.8062	43.6978	29	8.5025	8.4037	8.3052
-5	43.5409	42.4906	41.4615	30	8.1494	8.0512	7.9534
-4	41.2831	40.3086	39.3531	31	7.8128	7.7154	7.6184
-3	39.1559	38.2516	37.3644	32	7.4919	7.3953	7.2993
-2	37.1508	36.3117	35.4880	33	7.1859	7.0903	6.9953
-1	35.2603	34.4817	33.7169	34	6.8940	6.7995	6.7056
0	33.4771	32.7547	32.0447	35	6.6156	6.5221	6.4294
1	31.7945	31.1243	30.4652	36	6.3498	6.2576	6.1660
2	30.2064	29.5847	28.9728	37	6.0962	6.0051	5.9148
3	28.7068	28.1301	27.5623	38	5.8540	5.7642	5.6752
4	27.2904	26.7556	26.2286	39	5.6227	5.5342	5.4465

H. Troubleshooting

Symptoms	Cause	Remedy
The fan coil does not start up	No voltage	Check for presence of voltage Check fuse on board
	Mains switch in the “OFF position	Place in the “ON” position
	Faulty room control	Check the room control
	Faulty fan	Check fan motor
Insufficient output	Filter clogged	Clean the filter
	Air flow obstructed	Remove obstacles
	Room control regulation	Check the room air sensor
	Incorrect water temperature	Check the water source
	Air present	Check the air vent
Noise and vibrations	Contact between metal parts	Check for loosening parts
	Loose screws	Tighten screws

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Note: All the information or data in this manual may be changed without notice.

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