POLAR AIR

INSTALLATION, OPERATION AND SERVICE MANUAL

PHW-V/P-ECM

HIGHWALL

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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.

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.

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.

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.

EUROVENT CERTIFICATION

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. Products certified by CE and AHRI, giving you the confidence of knowing our company is the right choice when selecting fan coil units.

WEEE MARK

All products conform to the “WEEE” directive to guarantee correct standards of environmental solutions.

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

Table of Contents

Model Code Nomenclature

PHW - 200 - V I - ECM

ECM	EC Motor Configuration

I	Intelligent control
W	Flexible function onboard PCB with louver and zone control functionality.

V	2-Pipe System
P	4-Pipe System
VEH	Chilled Water, 2-Pipe with Electric Heater

200/300/ 400/500/ 600/750	Unit size. See General Specifications for cooling/heating capacities

PHW	Hydronic High-Wall Series

A. Technical Data
A.1. General Description

This High Wall Unit is designed to meet and exceed demanding requirements for efficiency, quiet operation and appearance. The sleek profile and elegantly styled cabinet complement interior design theme, while the microprocessor assures accurate environmental control.

Cabinet ~ the stylish cabinet is constructed of durable flame resistant acrylonitrile-butadiene-styrene (ABS) plastic. The silver white color and rounded corners provide its modern look.

Water Coil~ the water coil has a large heat transfer surface and utilizes the latest fin profile technology. It combines an advanced technology approach with these security of a traditional design regarding tube thickness. The coil is 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. The coil is tested at 25 bar and recommended for maximum operating at 16 bar. It includes manual air vent and water purge valve.

Integral Hoses~ an integral hose is stainless and brass connectors, which enables quick, low cost connections with no brazing.

Blower and Motor ~ the unit incorporates only specially designed and tested EC motors, allowing the blower wheel to provide optimum performance in airflow efficiency and quiet operation.

Filters~ washable, easy-to-remove, fine mesh air filters are standard to all high wall models. Removing the filters requires no tools are required, nor any dismantling of the equipment.

Air Grille Distribution ~all units are equipped with deflector blades and independent directional vanes, enabling supply air to be automatically distributed, and airflow and direction to be customized.

Microprocessor Control (I control)
~ The main design features include:
~ High efficiency EC motor with PID algorithmic processing in auto-mode.
~ 2-pipe, 2-pipe with booster electric heat, 2-pipe with primary electric heat, 4-pipe.
~ Cool, Heat, Auto, Dehumidifier and Fan modes.
~ Sleep, Auto-Fan, Daily Timer, Auto-Restart with memory functions.
~ User friendly remote control handset.
~ Heat and cool temperature protections and safety cut out.
~ 3-way on/off valve, 2-way on/off valve or modulating valve control.
~ Wired wall pad controller (optional) with 7-day programmable timer, real-time clock and error diagnostics.
~ Auxiliary switch for cooling and heating signal to external chiller / boiler.
~ Occupancy (remote on/off) contacts / economy mode contacts.
~ Open Modbus communication protocol.

Variable water flow system
The water flow through the fan coil is controlled by a temperature difference between the flow and return pipework – referred to as $\triangle$t, to ensure the correct heat transfer from the water to the air. Constant $\triangle$t keep the unit running efficiency and consequently the whole life running costs of the system.

Limited function microprocessor control (W control)
A 230VAC signal from the thermostat which working power is from R and C or from indoor room is supplied to terminal H/M/L to limited PCB. When any of H/M/L are powered ON or 0~10Vdc input is more than 2.5 Vdc, the unit is turned on and louver is open at the best position. When all of H/M/L is powered OFF and 0~10Vdc input is 0 Vdc, the unit is turned OFF and louver is closed. Alarm notification and zone control function are available. 40VA 24vac transformer is equipped with unit (optional), which is used to supply 24Vac power to thermostat and modulating valve.

A.2. General Specifications

A.2.1. 2-pipe Systems

Product range: PHW-ECM Hydronic High Wall Unit with EC Motor

PHW-[Size]-V~-ECM					200	300	400	500	600	750
Unit Configuration		Configuration			2-pipe					
		Number Of Fan Blower			Single					
		Power Supply		(V/Ph/Hz)	220~240/1/50					
		Operation Control			~I: Intelligent controller with VWV control logic					
					~W: EC motor driver					
Performance Data	Air	Air Flow	H	m^3/hr	380	550	680	788	1050	1250
			M		270	380	550	600	850	1020
			L		200	270	340	380	510	600
	Cooling	Cooling Capacity	H	kW	1.85	2.51	3.3	4.37	5.03	6.57
			M		1.43	1.92	2.84	3.58	4.25	5.6
			L		1.12	1.46	1.94	2.52	2.89	3.72
		Sensible Cooling Capacity	H		1.33	1.84	2.39	3.12	3.62	4.73
			M		1.01	1.37	2.04	2.52	3.02	3.97
			L		0.78	1.03	1.36	1.73	2.01	2.58
		Latent Cooling Capacity	H		0.52	0.67	0.91	1.25	1.41	1.84
			M		0.42	0.55	0.8	1.06	1.23	1.63
			L		0.34	0.43	0.58	0.79	0.88	1.14
	Heating	Heating Capacity	H	kW	1.9	2.62	3.4	4.39	5.1	6.64
			M		1.48	1.99	2.91	3.57	4.35	5.7
			L		1.16	1.52	2	2.51	2.94	3.77
		Max. Electric Heater Capacity			1		1.5			
	Sound	Sound Pressure Level (Outlet)		dB(A)	33/27/25	42/33/27	47/42/30	50/45/33	51/46/32	53/48/36
		Sound Power Level (Outlet)			42/36/34	51/42/36	56/51/39	59/54/42	60/55/41	62/57/45
	Electrical	Power input in cooling mode	H	W	13	20	30	38	50	65
			M		9	13	20	25	31	40
			L		7	9	11	13	12	16
		Fan Motor Running Current @ H		A	0.118	0.185	0.283	0.35	0.435	0.534
	Hydraulic	Cooling Water Flow Rate	H	L/h	316	431	565	749	863	1126
			M		244	329	487	614	729	960
			L		193	251	333	432	496	638
		Cooling Pressure Drop	H	kPa	10.0	9.6	14.8	20.0	32.5	56.1
			M		6.3	5.9	11.3	14.0	24.0	42.1
			L		4.1	3.6	5.7	7.4	12.0	20.2
		Heating Water Flow Rate	H	L/h	326	449	583	753	874	1138
			M		253	342	498	612	745	977
			L		199	261	343	431	504	647
		Heating Pressure Drop	H	kPa	8.6	8.5	9.2	20.1	30.7	57.3
			M		5.5	5.2	7.0	13.9	23.1	43.5
			L		3.6	3.2	3.6	7.4	11.4	20.7
		Water Content		L	0.527	0.527	0.8151	1.054	1.012	1.311
Construction and Packing Data		Water Connections	Type		PT Threaded Male (from the hose)					
			In	mm[in]	12.7 [1/2]					
			Out							
		Condensate Drainage Connection			16 [5/8]					
		Dimensions	L	mm	1010				1175	
			W		230				230	
			H		300				300	
		Net Weight		kg	12	14	15	17	18	19

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: 45/40C.

A.2.2. 4-pipe Systems

Product range: PHW-ECM Hydronic High Wall Unit with EC Motor

PHW-[Size]-P~-ECM						500	750
Unit Configuration		Configuration				2-pipe	
		Number Of Fan Blowers				Single	
		Power Supply			(V/Ph/Hz)	220~240/1/50	
		Operation Control				~I: Intelligent controller with VWV control logic	
						~W: EC motor driver	
Performance Data	Air	Air Flow		H	m3/hr	788	1250
				M		600	1020
				L		380	600
	Cooling	Cooling Capacity		H	kW	3.15	4.91
				M		2.58	4.18
				L		1.81	2.78
		Sensible Cooling Capacity		H		2.21	3.45
				M		1.79	2.9
				L		1.23	1.88
		Latent Cooling Capacity		H		0.94	1.46
				M		0.79	1.28
				L		0.58	0.9
	Heating	Heating Capacity		H	kW	2.3	3.3
				M		1.87	2.8
				L		1.32	1.87
	Sound	Sound Pressure Level (Outlet)			dB(A)	50/45/33	53/48/36
		Sound Power Level (Outlet)				59/54/42	62/57/45
	Electrical	Power input in cooling mode		H	W	38	65
				M		25	40
				L		13	16
		Fan Motor Running Current @ H			A	0.35	0.534
	Hydraulic	Cooling Water Flow Rate		H	L/h	539	841
				M		442	717
				L		311	477
		Cooling Pressure Drop		H	kPa	21.1	53.2
				M		14.8	39.9
				L		7.8	19.1
		Heating Water Flow Rate		H	L/h	197	283
				M		161	240
				L		113	161
		Heating Pressure Drop		H	kPa	6.5	12.4
				M		4.5	9.2
				L		2.4	4.5
		Chilled Water Content			L	0.7671	0.9533
		Hot Water Content			L	0.2877	0.3575
Construction and Packing Data		Water Connections		Type		PT Threaded Male (from the hose)	
				In	mm[in]	12.7 [1/2]	
				Out			
		Condensate Drainage Connection				16 [5/8]	
		Dimensions		L	mm	1010	1175
				W		230	230
				D		300	300
		Net Weight			kg	18	20

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):

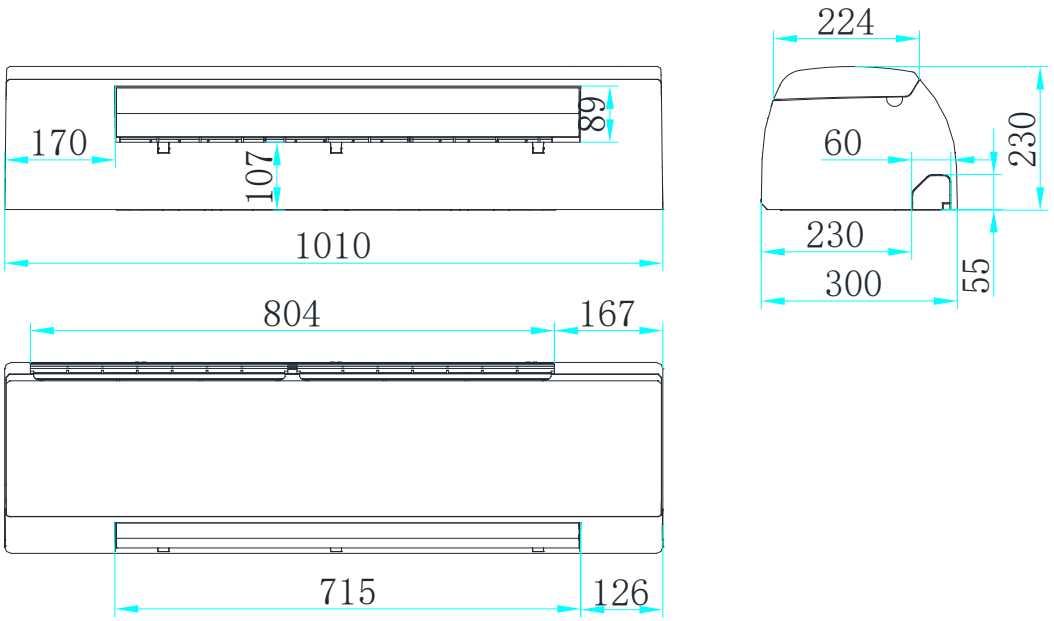
- Return air temperature: 20C.
- Inlet/outlet water temperature: 65/55C.

A.3. Coil Data

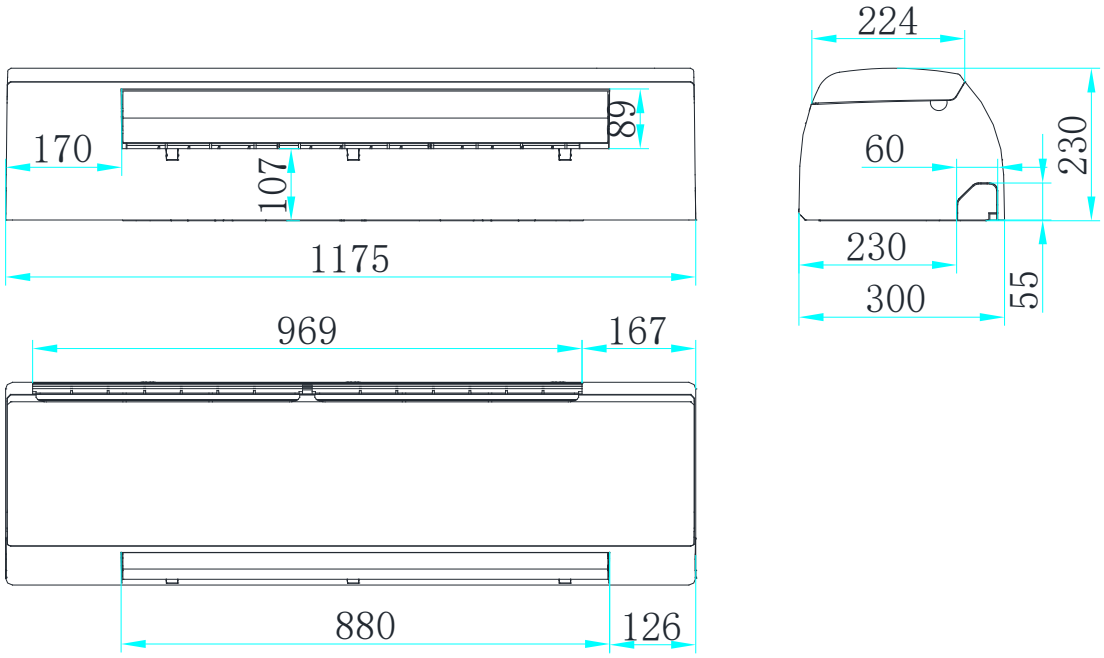
Model	Fin Height(mm.)	Fin Length(mm.)	Fins per inch	No. of Rows	No. of Copper	No. of Circuits	Tube Diameter (mm)
PHW-200	230	680	19.5	2	18	3	7
PHW-300	230	680		2	22	4	7
PHW-400	357	680		2	34	6	7
PHW-500	357	680		2.5	44	6	7
PHW-600	357	845		2	34	6	7
PHW-750	357	845		2.5	44	8	7

A.4. Dimensional Drawings

Dimensional drawing for PHW-200/300/400/500-ECM



Dimensional drawing for PHW-600/750-ECM



A.5. Sound power data

Model		PHW-200/300/400/500													
Speed		100RPM	200RPM	300RPM	400RPM	500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM
Sound Power dB(A)		32.2	32.3	32.8	33.1	35.2	35.6	39.1	43.5	47.4	50.6	53.7	56.2	59.3	61.3
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	20.0	18.0	19.7	14.7	16.7	21.1	16.3	18.6	21.5	18.5	22.1	20.5	22.3	19.8	21.3
	25.0	18.8	17.9	17.6	17.6	17.2	18.2	22.7	22.0	17.8	19.4	16.7	18.5	20.0	15.1
	31.5	15.3	21.5	25.1	17.1	21.8	15.6	19.0	18.3	21.8	19.1	20.5	18.4	17.8	14.8
	40.0	14.3	15.2	15.5	16.7	14.7	14.4	12.7	18.5	15.8	16.3	20.7	23.5	23.2	22.6
	50.0	17.3	17.7	18.3	19.4	15.7	18.6	16.1	18.8	20.5	21.5	21.4	23.8	26.2	28.7
	63.0	12.1	11.2	19.2	16.6	12.9	17.6	20.3	17.8	23.1	27.5	27.9	26.6	31.6	34.0
	80.0	9.8	10.9	10.1	23.5	13.7	13.9	18.8	23.2	23.0	23.1	32.4	33.7	37.8	35.8
	100.0	18.4	19.4	13.1	12.8	34.6	16.5	18.4	22.2	26.2	27.2	35.6	38.1	40.5	39.5
	125.0	11.6	12.6	17.6	10.6	16.3	25.9	25.4	23.7	27.8	29.7	35.5	36.6	42.7	43.7
	160.0	14.9	11.4	12.5	15.1	15.3	22.5	25.0	27.9	30.3	34.8	37.9	38.9	41.4	45.1
	200.0	13.5	14.2	13.3	14.2	18.1	19.0	22.9	27.4	30.0	35.9	37.3	41.0	41.1	44.9
	250.0	11.4	12.8	10.8	16.0	16.3	20.4	22.5	26.8	29.9	33.8	36.5	39.5	42.3	46.0
	315.0	11.7	12.9	11.6	13.6	24.1	21.7	25.3	31.5	32.9	37.1	39.3	42.6	45.4	47.2
	400.0	13.7	14.0	12.7	15.8	22.8	26.4	31.5	35.7	38.4	40.1	43.7	46.2	49.6	52.5
	500.0	15.0	15.4	14.3	16.0	21.7	24.8	32.1	37.2	42.2	42.5	45.4	47.6	49.8	51.7
	630.0	17.4	16.3	16.1	17.1	21.2	24.2	29.8	34.6	40.0	45.1	47.8	48.9	50.7	52.3
	800.0	16.4	16.2	16.8	18.1	20.4	22.2	27.0	31.3	36.6	40.1	44.1	48.3	50.1	52.3
	1000.0	17.3	17.1	18.0	20.0	23.4	22.7	28.0	32.7	37.6	41.0	44.5	48.1	51.1	53.7
	1250.0	18.8	18.4	19.6	20.9	22.7	21.4	23.9	28.8	34.5	38.3	41.7	45.0	47.7	50.2
	1600.0	18.8	19.1	18.8	20.2	21.4	21.1	22.2	26.0	30.7	34.6	38.5	43.0	45.7	48.8
	2000.0	19.2	19.8	20.1	19.9	20.9	19.9	20.9	23.1	27.6	32.4	36.5	39.7	43.0	46.2
	2500.0	19.6	20.0	19.9	19.8	20.3	20.2	20.6	21.6	25.0	28.8	33.2	37.4	40.5	43.6
	3150.0	20.2	20.4	20.3	20.1	20.6	20.7	21.1	21.2	23.4	26.0	30.3	33.6	37.0	40.5
	4000.0	20.4	20.4	20.4	20.8	20.4	20.7	20.8	21.0	22.6	24.6	28.9	32.8	36.3	39.5
	5000.0	20.4	20.6	20.4	20.5	20.6	20.5	20.6	21.0	21.4	22.7	25.3	28.8	32.0	35.6
	6300.0	20.3	20.2	20.1	20.3	20.4	20.2	20.1	20.5	20.5	20.9	22.5	25.1	28.3	31.4
	8000.0	19.1	19.2	19.2	19.1	19.1	19.2	19.2	19.1	19.2	19.2	20.0	21.6	23.8	27.1
	10000.0	17.5	17.4	17.3	17.6	17.4	17.3	17.3	17.3	17.3	17.5	17.7	18.0	19.1	20.9
	12500.0	14.6	14.5	14.4	15.1	15.1	14.3	14.2	15.8	14.4	14.3	14.6	14.7	15.3	17.1
	16000.0	11.0	11.1	11.0	15.2	15.6	11.2	11.2	25.1	11.6	11.5	11.5	12.0	12.1	12.8

Model		PHW-600/750													
Speed		100RPM	200RPM	300RPM	400RPM	500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM
Sound Power dB(A)		32.7	32.3	33.0	34.6	35.2	36.9	40.2	45.1	48.6	51.8	54.3	56.9	59.2	61.3
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	20.0	19.4	19.5	20.8	20.0	18.9	19.8	17.0	19.9	15.5	20.0	21.2	19.9	19.1	22.5
	25.0	20.5	17.9	20.7	21.4	20.7	18.4	17.1	22.3	19.9	21.9	20.2	19.1	18.9	24.0
	31.5	19.8	16.2	17.0	20.4	15.6	17.7	19.5	20.9	15.6	13.3	18.0	15.2	19.2	16.1
	40.0	14.3	13.2	17.0	24.9	14.0	17.8	18.6	20.3	19.0	16.5	19.0	24.3	24.8	21.5
	50.0	19.0	15.8	18.7	17.0	18.3	16.9	17.9	20.3	17.2	18.8	22.3	22.4	25.0	26.0
	63.0	16.2	15.1	18.5	18.6	19.5	19.2	18.5	18.2	19.5	24.3	25.8	28.9	28.0	30.0
	80.0	12.7	14.8	12.5	24.9	12.0	13.2	17.1	20.7	24.1	28.5	33.2	31.4	35.3	35.4
	100.0	14.4	14.5	12.0	16.2	25.7	17.8	20.7	23.0	28.7	27.4	33.7	34.3	36.4	37.6
	125.0	10.7	12.1	17.7	16.0	18.9	20.9	23.2	24.9	28.3	33.9	34.8	36.3	36.8	42.9
	160.0	12.3	13.1	12.4	20.5	17.7	24.2	27.0	30.0	31.4	31.8	35.1	38.3	42.6	44.2
	200.0	13.5	13.6	12.5	13.5	23.2	21.6	29.6	34.2	34.6	35.1	38.8	38.9	43.0	43.3
	250.0	11.5	12.8	11.0	13.4	15.0	24.8	29.2	29.4	33.9	37.8	38.3	39.8	41.5	41.3
	315.0	13.8	12.7	15.0	18.3	19.2	22.7	29.4	36.2	40.0	36.5	40.9	43.2	46.0	46.9
	400.0	15.3	15.6	15.6	17.1	21.7	25.9	31.0	33.9	38.2	41.0	44.3	46.1	49.1	51.1
	500.0	17.3	15.9	16.2	19.6	19.9	26.0	31.5	37.3	40.0	42.1	44.2	46.3	49.3	51.8
	630.0	18.0	17.8	17.2	21.5	20.3	26.3	31.7	36.6	40.7	45.1	47.5	49.8	51.3	53.3
	800.0	17.4	17.8	18.0	21.7	21.6	26.2	31.4	35.9	40.6	45.1	47.3	50.3	51.8	54.5
	1000.0	18.2	18.5	19.6	21.7	21.5	24.7	28.7	32.9	37.6	41.6	44.4	47.2	49.4	52.1
	1250.0	19.2	19.1	20.7	21.6	24.5	26.0	28.6	32.7	36.0	41.2	44.2	47.4	49.2	51.4
	1600.0	18.7	18.8	18.9	19.2	20.4	21.3	23.5	27.1	31.3	35.8	39.5	42.3	45.5	48.3
	2000.0	19.7	19.4	19.5	19.9	20.0	20.8	21.8	25.6	29.6	34.1	37.6	41.6	44.9	47.3
	2500.0	19.6	19.7	19.7	19.9	20.0	20.2	20.8	22.7	25.6	29.8	33.6	37.0	40.2	43.5
	3150.0	20.2	20.3	20.1	20.3	20.3	20.8	21.0	22.1	24.0	27.8	31.6	35.8	39.6	42.8
	4000.0	20.6	20.5	20.6	20.3	20.7	20.7	21.0	21.2	22.4	24.6	28.1	31.8	35.6	39.1
	5000.0	20.3	20.6	20.5	20.6	20.7	20.5	20.7	20.8	21.2	22.7	24.8	28.3	31.7	35.3
	6300.0	20.2	20.2	20.1	20.2	20.4	20.3	20.6	20.6	20.3	21.3	22.6	24.8	27.4	31.0
	8000.0	19.4	19.5	19.3	19.3	19.6	19.3	19.2	19.2	19.4	19.8	19.9	21.4	23.5	26.8
	10000.0	17.5	17.6	17.5	17.5	17.5	17.5	17.5	17.5	17.4	17.4	17.6	18.0	18.7	20.2
	12500.0	14.6	14.6	14.7	14.7	14.6	14.7	14.6	14.6	14.6	14.6	16.4	14.7	14.9	15.5
	16000.0	11.7	11.6	11.7	11.7	11.8	11.9	11.7	11.9	11.9	11.9	24.6	12.1	12.3	12.4

B. Installation

B.1. Safety Precautions

- When installing, performing maintenance or servicing 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.
- This unit must be connected to a protective earthing system. DO NOT remove the grounded connection while power is being supplied to the fan coil unit.
- When installing, performing maintenance or servicing fan coil units observe the precautions stated in this manual as well as those stated on the labels attached to the unit.
- 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.
- Children should be supervised to ensure they do not play with the appliance.
- 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. Operating Limits

Power supplies

Volt	Phase	Hz
220-240	1	50

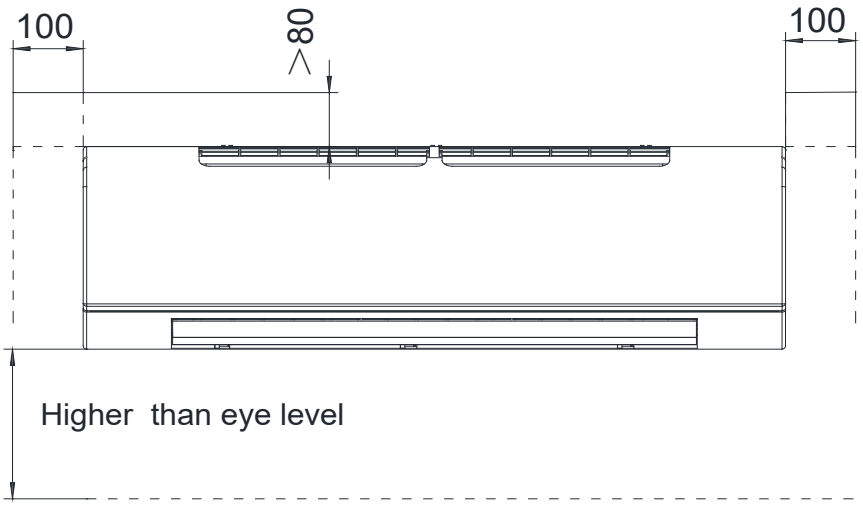
Water circuit

Minimum entering water temperature	+2 °C
Maximum entering water temperature	+70°C
Water side recommended maximum pressure	1600 kPa

B.3. Before Installation

Select the location for the high-wall unit with the following considerations:

1. The air inlet and outlet area should be clear without obstructions. The air should flow freely.
2. The high wall unit should be mounted on solid wall.
3. The location should allow easy access to connect water pipes easily achieve drainage.
4. Ensure the clearance around the fan coil unit conforms to the following drawing.

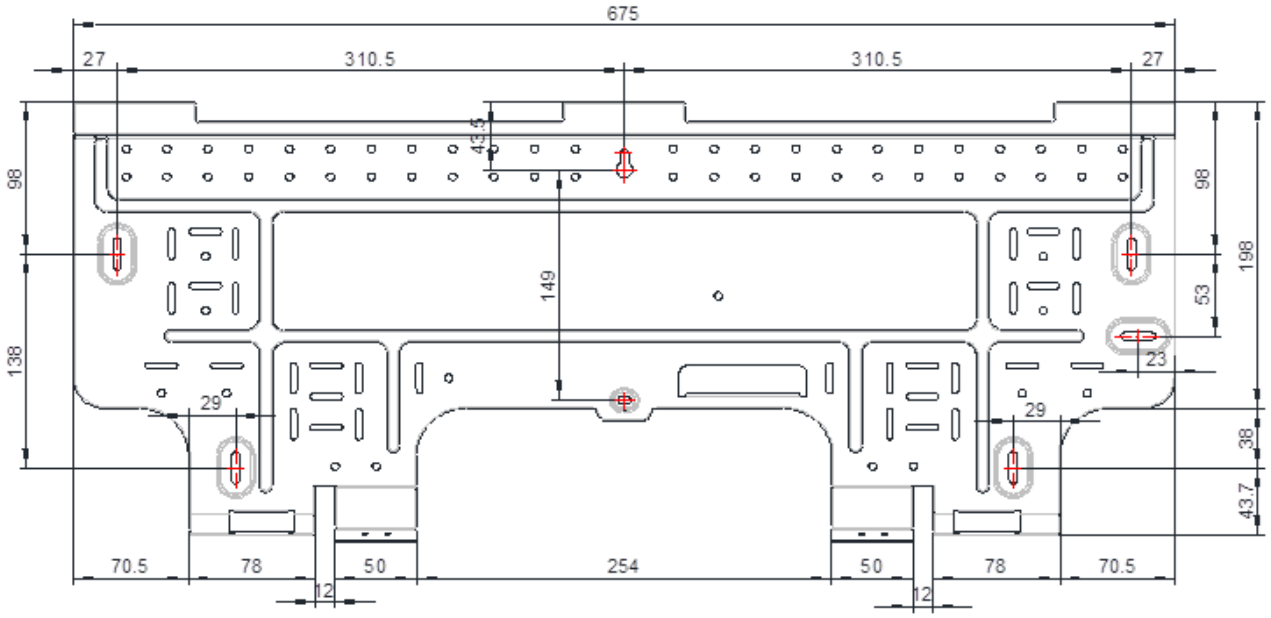


* Required clearance for maintenance and servicing is as shown above.

** All dimensions shown in mm.

5. The unit should be installed higher than eye level.
6. Avoid installing the unit with direct sunlight.
7. The signal receiver on the unit must be kept away from any high frequency emission source.
8. Keep the unit away from fluorescent lamps, which may affect the control system.
9. Avoid electromagnetic control system interference, ensure control wires are installed separately from power supply wires.
10. Use shielded sensor cables in where electromagnetic waves present,
11. Install a noise filter if the power supply creates any disruptive noises.

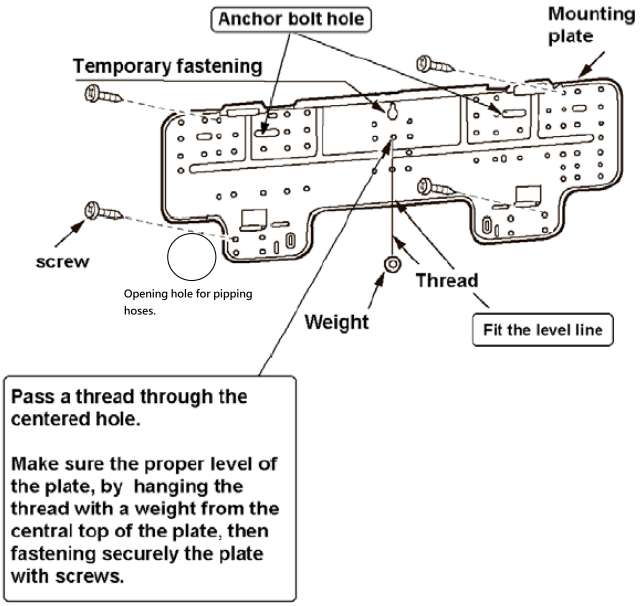
B.4. Mounting Plate Dimensions



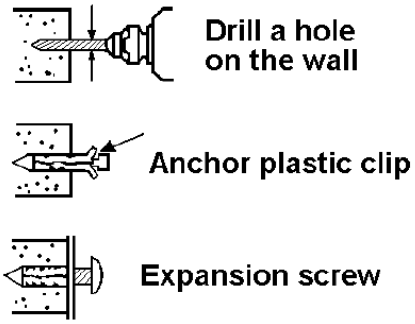
(All dimensions shown in mm)

B.5. Mounting Plate Installation

1. Select the structural position (e.g. a pillar or lintel) on the wall.
2. Then temporarily fasten the mounting plate on the wall with a steel nail.

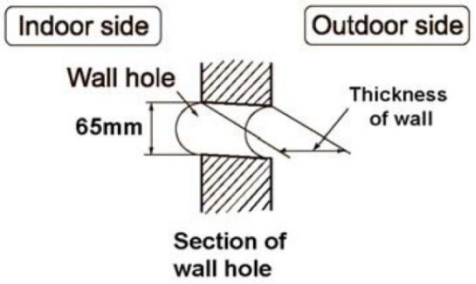


3. Mount the mounting plate horizontally as shown in the above figure or by means of gradiometer. Failed to follow this may cause water to drip indoors and create atypical noise.
4. Fix the mounting plate by means of expansion screws or tapping screws.



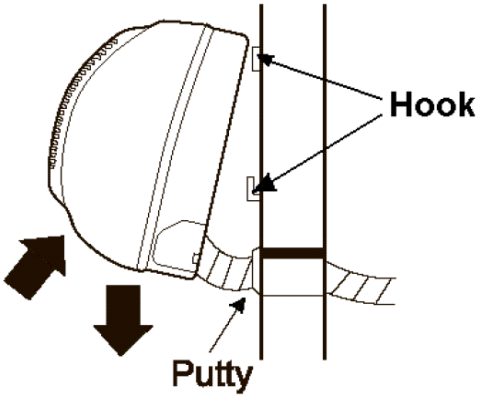
B.6. Condensate Drainage Hole Drilling

1. Ensure that the hole for condensate drainage is correctly positioned. The height should be lower than the bottom edge of the indoor unit.
2. Drill a 65mm diameter hole with a descending slope.
3. Seal it off with putty after installation.



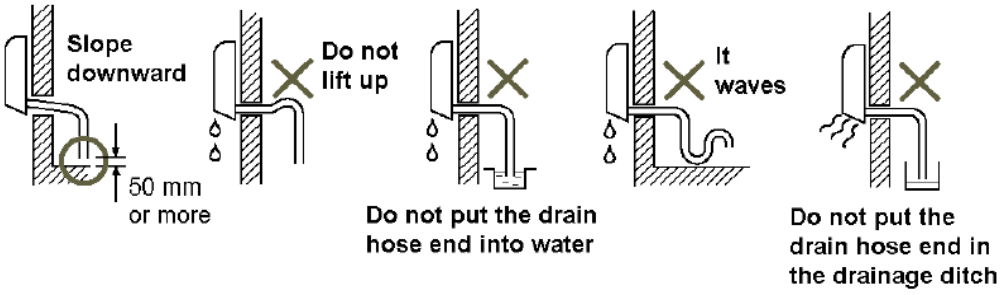
B.7. Hydronic Unit Installation

1. Pass the piping through the hole in the wall and hook the indoor unit on the mounting plate by the upper hooks.
2. Move the body of the unit from side to side to verify if it is securely fixed.
3. While pushing the unit toward the wall, lift it slightly from beneath to hook it up on the mounting plate by the lower hooks.
4. Make sure the unit firmly rests on the hooks of the mounting plate.

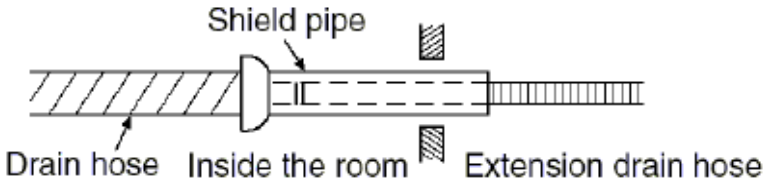


B.8. Drainage Piping Works

1. Install the drain hose so that it slopes downward slightly for free drainage. Avoid installing it as shown in the below illustrations marked with an “X”.



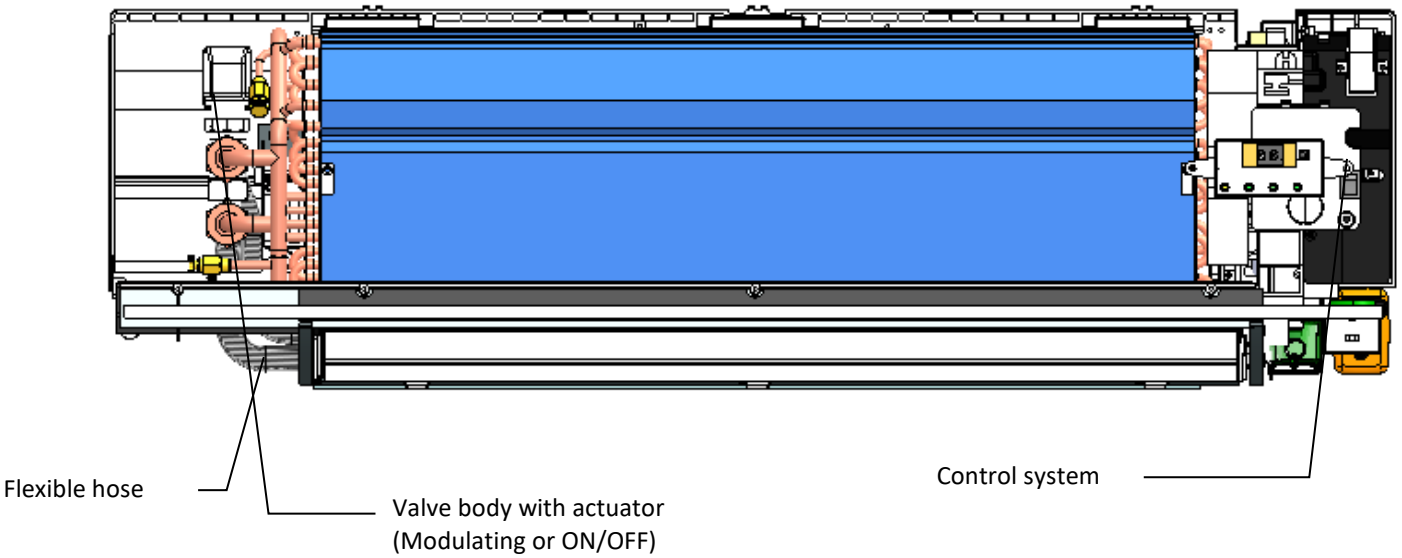
2. Put water in the drain pan and make sure that the water drains outdoors.
3. If the flexible drain hose provided with the indoor unit is not long enough, please extend it by joining it to an extension hose (not provided). Be sure to insulate the connecting part of the extension drain hose with a shield pipe as shown.



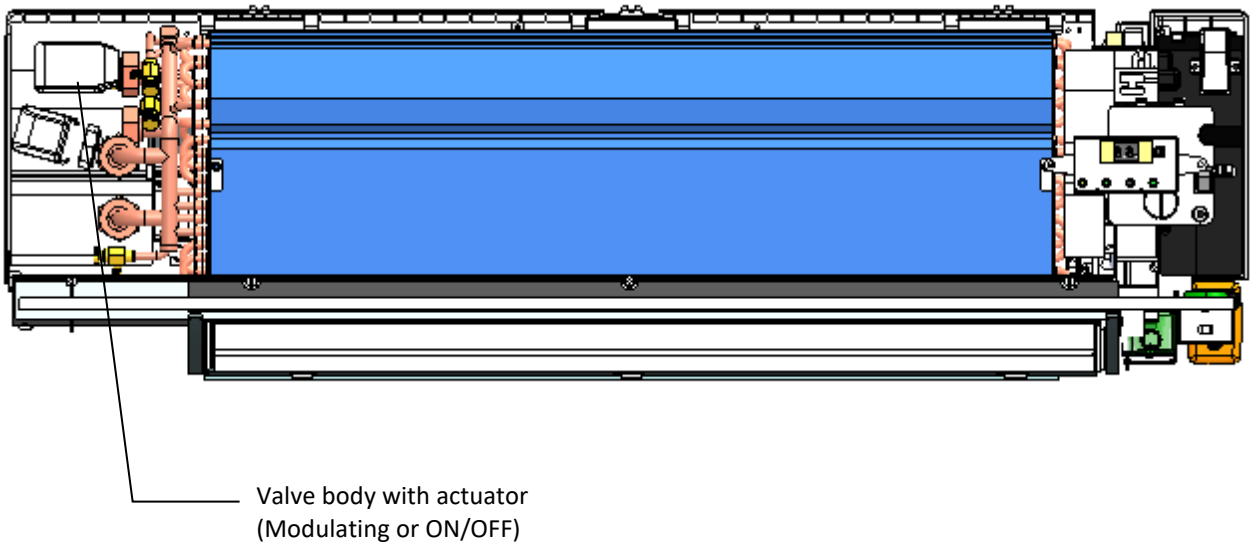
4. If the attached drain hose passes through an indoor area, insulate it with heat insulation material.

B.9. Pipe Connections with Valve

2-pipe system



4-pipe system



B.10. Electrical Connection

1. Wiring connection must be done according to the wiring diagram on the unit.
2. The unit must be GROUNDED well.
3. An appropriate strain relief device must be used to attach the power wires to the terminal box.
4. A 20mm hole is designed on the I terminal box for field installation of the strain relief device.
5. Field wiring must be complied with the national security regulations.

A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with the relevant local and national legislation

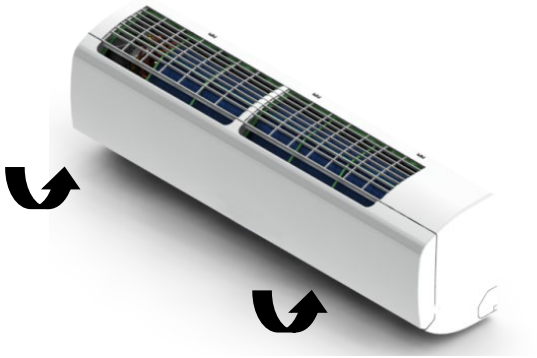
B.11. Start-Up

- The unit should not be started up until the system piping has been cleaned and all the air has been purged.
- Check condensate drain pipe slope.
- Confirm the condensate drain pump in good working order if installed.

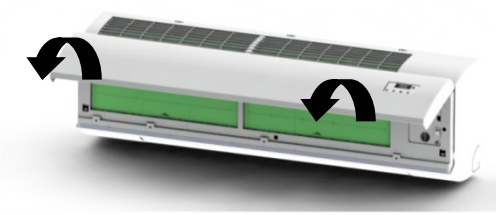
1. Verify air filter is clean and properly installed.
2. Ensure that voltage and current values correspond with the unit nameplate values. check electrical connections.
3. Verify louver is open.

C. Maintenance

C.1. Opening and Closing of Lift-Up Grille Cover



Open the grille cover by lifting from the bottom position indicated by the arrows.



Close the grille cover by pressing down at the positions indicated by the arrows.

C.2. Front Cover Assembly Removal

1. Set the horizontal louver to the horizontal position.
2. Remove the screw caps below the louver, and then remove the mounting screws.
3. Open the lift-up grille cover by grasping the panel at both sides as shown above.
4. Remove the remaining screws located in the center of the front cover.
5. Grasp the lower part of the front cover and pull the entire assembly out and up towards you.

C.3. Air Vent and Water Purge Valves

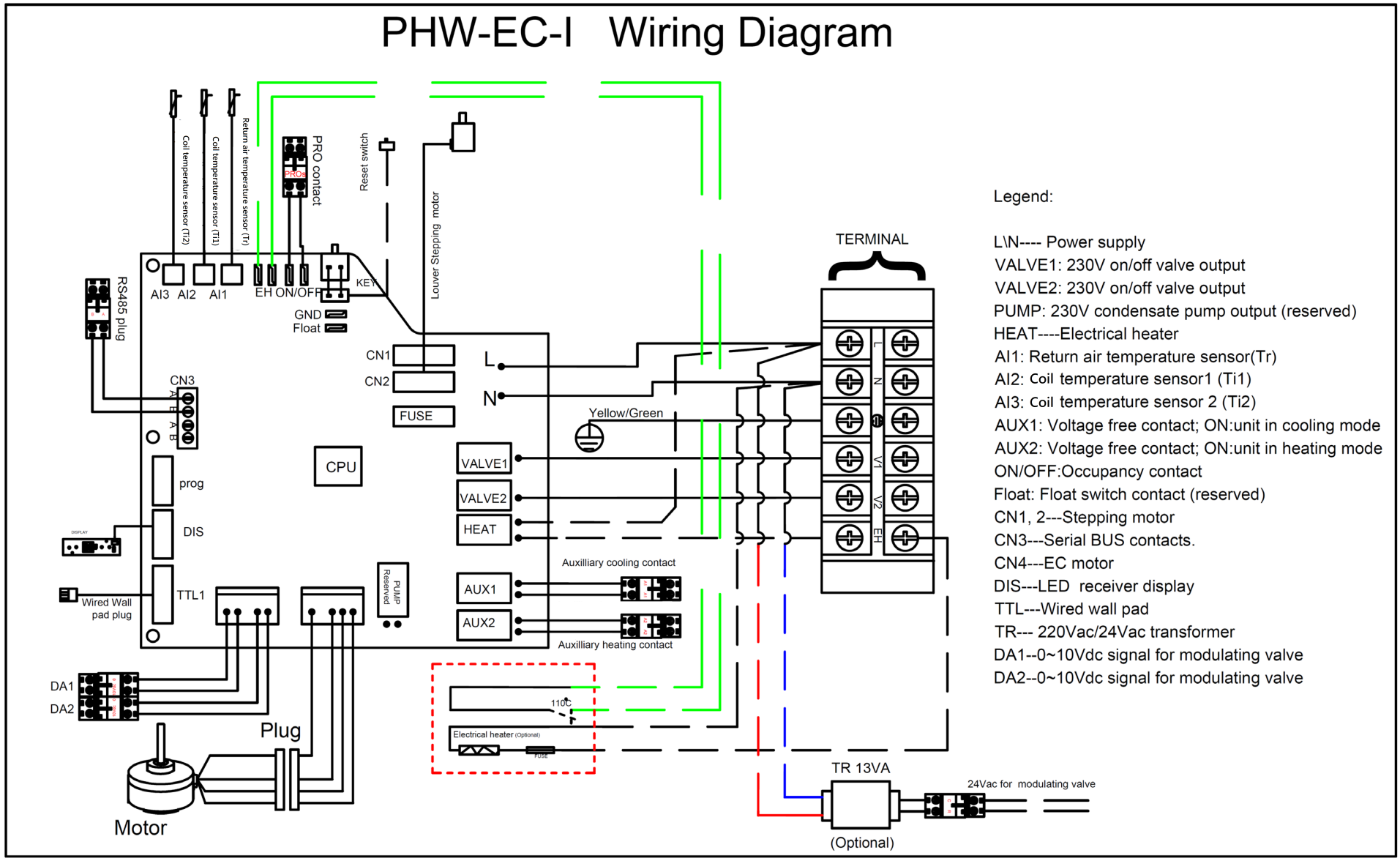
1. After connecting the water inlet and outlet pipes to the main supply lines turn on the main breaker and operate the unit in COOLING mode.
2. Open the water inlet valve and flood the coil.
3. Check all connections for water leakage. If no leak is found, open the purging valve with an open end wrench while supporting the unit with your other hand. Then purge the air trapped inside the coil. When performing this activity, take care not to touch the electrical parts.
4. Close the purging valve when no bubbles appear.
5. Open the water outlet valve.

D. Control Specifications: Intelligent Control (I Type)

D.1. I/O Port Definitions

I/O		Code	Description
Analogue Input	Return air sensor	AI1	Return air temperature (Tr)
	Coil temperature sensor(Ti1)	AI2	(2-pipe) Water inlet temperature sensor (4-pipe) Cooling coil temperature sensor
	Coil temperature sensor(Ti2)	AI3	(2-pipe) Water outlet temperature sensor (4-pipe) Heating coil temperature sensor
Input	IR receiver	DIS	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	⏚	Power supply to the PCB
Voltage output	Fan 1	CN4	Fan 1 driver
	Valve1	MTV1	On/off valve
	Valve2	MTV2	On/off valve
	Water pump	WP	Voltage output (L), Power supply to condensate pump (Reserved)
	Electric heater	Heat	Voltage output (L), maximum 10A
Output	Stepping motor	CN1, CN2	Power supply to louver stepping motors
	Cooling free contact.	AUX1	Voltage free contact. Maximum load 5A
	Heating free contact.	AUX2	Voltage free contact. Maximum load 5A
	Modulating valve control	DA1	0~10Vdc
	Modulating valve control	DA2	0~10Vdc
	In Modbus signal	AB	Terminals for local network serial connection

D.2. Wiring diagram



D.3. Control Logics 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. DA2 is turned on at 10VDC for 2 minutes, then check Ti1.

- When Ti1<=8ºC, DA2 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, DA2 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) ~10VDc.
- When 10<Ti1<=12ºC, DA2 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) ~10VDc.
- When 12<Ti1<=15ºC, DA2 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) ~10VDc.
- When 15<Ti1<=28ºC (Modbus 300017 setting), DA2 output is kept at 10Vdc.
- When Ti1>28ºC(Modbus 300017 setting), DA2 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. DA2 output is 0Vdc.

When unit is turned off, MTV1 and AUX1 are off. DA2 is 0Vdc. Fan is turned off with 30 seconds of delay.
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.
- DA2 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.
- DA2 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 (Modbus300043=0)
When unit is turned on in heating mode:
When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV1 and AUX2 is turned on. DA2 is at 10VDc for 2 minutes, then check Ti1:
- If Ti1 <28ºC (Modbus 300017 setting), fan is turned on at low speed. DA2 is at 10Vdc.
- If 28ºC<Ti1<28（Modbus 3000017 setting）+4ºC, fan is on at original state. DA2 is at original state.
- If Ti1 ≥ 28（Modbus 3000017 setting）+4ºC , fan is on at setting speed. DA2 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting PID calculation. The output is minimum output (Modbus300015 setting) ~10VDc.
- If Ti1 sensor is damaged, fan is worked at setting speed.
- When Tr > Ts+ 1ºC (Modbus 300033 setting), MTV1 and AUX2 is turned off. DA2 is at 0VDc. fan is turned on at lowest speed.
- When unit is turned off, MTV1 and AUX2 is turned off. DA2 is at 0VDc. Fan is turned off with 2 minutes of delay.

With Electrical Heater as booster (Modbus300043=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. DA2 is at 10VDc for 2 minutes, then check Ti1:

- If Ti1 <28ºC (Modbus 300017 setting), EH is turned on. DA2 is at 10Vdc.
- If 28ºC<Ti1<28（Modbus 3000017 setting）+4ºC, EH is kept at original state. DA2 is at original state.
- If Ti1 ≥ 28（Modbus 3000017 setting）+4ºC , EH is turned off. DA2 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting PID calculation. The output is minimum output (Modbus300015 setting) ~10VDc.
- If Ti1 sensor is damaged, fan is worked at setting speed.

When Tr > Ts+ 1ºC (Modbus 300033 setting), MTV1 and AUX2 is turned off. EH is turned off. DA2 is at 0VDc. fan is turned on at low speed.

When unit is turned off, MTV1 and AUX2 is turned off. DA2 is at 00VDc. Fan is turned off with 2 minutes of delay.

With Electrical Heater as primary (Modbus300043=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 ºC , EH is turned off. fan is turned on at low speed.

When unit is turned off, EH is turned off. Fan is turned off with 2 minutes of delay.

Over-heat protection of indoor coil

If Ti1 ≥ 75ºC, then MTV1 ,AUX2, DA2 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 30 seconds, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA2 is on at 3 times of (Modbus 300016 setting). Fan is turned on at low speed.
- If 16ºC ≤ Tr < 25ºC for 30 seconds, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA2 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. DA2 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 30 seconds, then check Tr and Ts:

- If Ts>=Tr+3 ºC, the unit is in heating mode.
- If Tr-3 ºC<Ts<Tr+3 ºC, the unit is in fan mode.
- If Ts<Tr-3 ºC, the unit is 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 Modbus 100004 setting=0:

The unit is on:

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

When Modbus 100004 setting=1:

When the unit is on or standby, PRO input is open or closed, the unit is kept original state.

When the unit is off:

- PRO input is closed for 30 seconds, MTV1 is turned on, DA2 is open at double of minimum setting (Modbus 300027 setting). Fan is turned on at low speed.
- PRO input is opened for 30 seconds, MTV1 is off, DA2 is 0Vdv, 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. 2-pipe Control Logic-Without Valve Configuration

Cool mode

When unit is turned on in cooling mode.

- If Tr ≥ Ts + 1ºC (Modbus 300033 setting), AUX1 is closed. Fan is turned on at setting speed.
- If Tr < Ts- 1ºC (Modbus 300033 setting), then cool operation is terminated and AUX1is turned off. Indoor fan runs at super low speed.

When unit is turned off, AUX1 is off. Fan is turned off with 30 seconds of delay.
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
Indoor fan is turned on to medium speed if fan runs at low speed.
If Ti1 ≧ 5ºC for 2 minutes
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 (Modbus300043=0)

When unit is turned on in heating mode.
When Tr ≤ Ts - 1 ºC(Modbus 300033 setting), AUX2 is turned on. then check Ti1 in 2 minutes:
If Ti1 <28ºC (Modbus 300017 setting), fan is turned on at low speed.
If 28ºC<Ti1<28（Modbus 3000017 setting）+4ºC, fan is on at original state.
If Ti1 ≥ 28（Modbus 3000017 setting）+4ºC , fan is on at setting speed.
If Ti1 sensor is damaged, fan is worked at setting speed.
When Tr > Ts+1ºC (Modbus 300033 setting,AUX2 is turned off. fan is turned on at lowest speed.
When unit is turned off, AUX2 is turned off. Fan is working at setting speed if Ti2 ≥ 38ºC.Fan is turned off delaying 2 minutes.

With Electrical Heater as booster (Modbus300043=1)

When unit is turned on in heating mode.
When Tr ≤ Ts - 1 ºC(Modbus 300033 setting),AUX2 is turned on. Fan is turned on at setting speed. then check Ti1 in 2 minutes:
If Ti1 <28ºC (Modbus 300017 setting), EH is turned on.
If 28ºC<Ti1<28（Modbus 3000017 setting）+4ºC, EH is kept at original state.
If Ti1 ≥ 28（Modbus 3000017 setting）+4ºC , EH is turned off.
If Ti1 sensor is damaged, fan is worked at setting speed.
When Tr > Ts +1ºC (Modbus 300033 setting), AUX2 is turned off. EH is turned off. fan is turned on at low speed.
When unit is turned off, AUX2 is turned off. Fan is turned off delaying 2 minutes.

With Electrical Heater as primary (cannot be set)

Over heat protection of indoor coil

If Ti1 ≥ 75ºC, then AUX2is 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:
1) AUX1 is turned on. Fan is turned on at low speed.

Auto mode cannot be set.

D.3.3. 4-pipe Control Logic-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.
DA2 is turned on at 10VDC for 2 minutes, then check Tr and Ts.

DA2 output is from minimum (Modbus 300016 setting) ~10Vdc based on Tr and （Ts +2） 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. DA2 output is 0Vdc.

When unit is turned off, MTV1 and AUX1 are off. DA2 is 0Vdc. Fan is turned off with 30 seconds of delay.
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.
DA2 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.
DA2 is set to original status.
Indoor fan is changed to set 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（Modbus300043=0）
When unit is turned on in heating mode.
When Tr ≤ Ts - 1 ºC (Modbus 300033 setting), MTV2 and AUX2 is turned on. DA3 is at 10VDc for 2 minutes, then check Ti2:
- If Ti2<28ºC (Modbus 300017 setting), fan is turned on at low speed. DA3 is at 10Vdc.
- If 28ºC<Ti2<28（Modbus 3000017 setting）+4ºC, fan is on at original state. DA3 is at original state.
- If Ti2 ≥ 28（Modbus 3000017 setting）+4ºC , fan is on at setting speed. DA3 output is from minimum (Modbus 300016 setting) ~10Vdc based on Tr and （Ts-2） PID calculation.

If Ti2 sensor is damaged, fan is worked at setting speed.
When Tr > Ts +1ºC (Modbus 300033 setting, MTV2 and AUX2 is turned off. DA3 is at 0VDc. fan is turned on at lowest speed.
When unit is turned off, MTV2 and AUX2 is turned off. DA3 is at 00VDc. Fan is turned off with 2 minutes of delay.

With Electrical Heater as booster（Modbus300043=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. DA3 is at 10VDc for 2 minutes, then check Ti2:
If Ti2<28ºC (Modbus 300017 setting), EH is turned on. DA3 is at 10Vdc.
If 28ºC<Ti2<28（Modbus 3000017 setting）+4ºC, EH is kept at original state. DA3 is at original state.
If Ti2 ≥ 28（Modbus 3000017 setting）+4ºC , EH is turned off. DA3 output is from minimum (Modbus 300016 setting) ~10Vdc based on Tr and （Ts -2） PID calculation.
If Ti2 sensor is damaged, fan is worked at setting speed.
When Tr > Ts+1ºC (Modbus 300033 setting, MTV2 and AUX2 is turned off. EH is turned off. DA3is at 0VDc. fan is turned on at low speed.
When unit is turned off, MTV2 and AUX2 is turned off. DA3 is at 0VDc. Fan is turned off with 2 minutes of delay.

Over-heat protection of indoor coil
If Ti2 ≥ 75ºC, then MTV2, AUX2, DA2 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. DA2 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. DA2 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. DA2 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 30 seconds, then check Tr and Ts:

- If Ts>=Tr+3 °C, the unit works in heating mode.
- If Tr-3 °C<Ts<Tr+3 °C， the unit works in fan mode.
- If Ts<Tr-3 °C， the unit works in cooling mode.

If unit works in heating or fan mode, when Tr-Ts>3.0°C, MTV2, MTV1 and DA2 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>3.0°C, MTV2, MTV1 and DA1 is off for more than 10minutes. the unit will work in heating mode.

PRO input function

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 30 seconds, MTV1, MTV 2are turned on, DA2, DA3are open at double of minimum setting (Modbus 300027 setting), Fan is turn on at low speed.

PRO input is opened for 30 seconds, MTV1, MTV2 are off, DA2, DA3 are 0Vdv, Fan is turned 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.3.4. 2-pipe Control Logic-With 6-way modulating Valve Configuration

Cool mode

When unit is turned on in cooling mode.

If Tr ≥ Ts + 1°C (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed.

DA2 is turned on at 0VDC for 2 minutes, then check Ti1:

- When Ti1<=8°C, DA2 output is based on water temperature difference (Ti1/Ti2) and Modbus parameter 300027 setting PID calculation. The output is 4~0VDc.
- When 8<Ti1<=10°C, DA2 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<=12°C, DA2 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<=15°C, DA2 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<=28°C (Modbus 300017 setting), DA2 output is kept at 0Vdc.
- When Ti1>28°C(Modbus 300017 setting), DA2 output is 4Vdc and report pre-heat alarm.

If Tr < Ts-1°C (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA2 output is 5Vdc.

When unit is turned off, MTV1 and AUX1 are off. DA2 is 5Vdc. Fan is turned off with 30 seconds of delay.

Low temperature protection of indoor coil in cooling mode

If Ti1 ≦ 2 °C for 2 minutes

- MTV1 is turned OFF.
- DA2 is set to 5Vdv.
- Indoor fan is turned on to medium speed if fan runs at low speed.

If Ti1 ≧ 5°C for 2 minutes

- MTV1 is turned ON.
- DA2 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（Modbus300043=0）

When unit is turned on in heating mode.

When Tr ≤ Ts - 1 °C(Modbus 300033 setting) , MTV2 and AUX2 is turned on. DA2 is at 10VDc for 2 minutes, then check Ti1:

- If Ti1 <28°C (Modbus 300017 setting), fan is turned on at low speed. DA2 is at 10 Vdc.
- If 28°C<Ti1<28（Modbus 3000017 setting）+4°C, fan is on at original state. DA2 is at original state.
- If Ti1 ≥ 28（Modbus 3000017 setting）+4°C , fan is on at setting speed. DA2 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 is worked at setting speed.

When Tr > Ts+1°C (Modbus 300033 setting, MTV1 and AUX2 is turned off. DA3 is at 5VDc. fan is turned on at lowest speed.

When unit is turned off, MTV1 and AUX2 is turned off. DA2 is at 5VDc. Fan is turned off delaying 2 minutes.

With Electrical Heater as booster（Modbus300043=1）

When unit is turned on in heating mode.

When Tr ≤ Ts - 1 °C(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 Ti1:

- If Ti1 < 28°C (Modbus 300017 setting), EH is turned on. DA2 is at 10Vdc.
- If 28°C<Ti1< 28（Modbus 3000017 setting）+4°C, EH is kept at original state. DA2 is at original state.
- If Ti1 ≥ 28（Modbus 3000017 setting）+4°C , EH is turned off. DA2 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 is worked at setting speed.

When Tr > Ts+ 1°C (Modbus 300033 setting), MTV2 and AUX2 is turned off. EH is turned off. DA2 is at 5VDc. fan is turned on at low speed.

When unit is turned off, MTV2 and AUX2 is turned off. DA2 is at 5VDc. Fan is turned off with 2 minutes of delay.

Over-heat protection of indoor coil
If Ti1 ≥ 75°C, then MTV1 ,AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
If Ti1 < 70°C, 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 °C.

- If Tr ≥ 25°C for 30 seconds, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA2 is 2vdc. Fan is turned on at low speed.
- If 16°C ≤ Tr < 25°C for 30 seconds, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA2 is 2.5VDC. Fan is turned on at low speed.
- If Tr < 16°C for 30 seconds, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA2 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 30 seconds, then check Tr and Ts.:

- If Ts>=Tr+3 °C, the unit works in heating mode.
- If Tr-3 °C<Ts<Tr+3 °C， the unit works in fan mode.
- If Ts<Tr-3 °C， the unit works in cooling mode.

If unit works in heating or fan mode, when Tr-Ts>3.0°C, MTV2, MTV1 and DA2 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>3.0°C, MTV2, MTV1 and DA2 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 60 seconds, the unit is turned off.
PRO input is open for 60 seconds, the unit is turned on.

D.4. 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 0.5°C each 30 minutes. Maximum setting temperature increased is 3°C.
In HEAT mode, after SLEEP mode is set, the indoor fan will run at auto speed and Ts will decrease by 0.5°C each 30 minutes. Sleep mode is turned off, setting temperature go back and Fan is change to setting speed.

D.5. Auto speed

Indoor fan speed can be adjusted for low, medium and high or auto speed.

D.6. Stepping motor

For remote handset
Whenever the indoor fan is running, the louver can swing or stop at the desired position.
Louver angle: 0~100°, opens clockwise with widest angle at 100°.
Swing angle: 35~100°, opens clockwise to 68°. Below are the 4 fixed positions which can be set from wireless LCD handset.

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

For wired wall pad
Louver angle: 0~100°, opens clockwise, with widest angle at 100°.

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

D.7. Buzzer

The unit will beep once when it receives 1 signal.

D.8. 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. When power supply resumes or the system is switched on again, the same operations as previously set will function.

D.9. On/Off Switch

This is a tact switch to select COOL → HEAT → OFF operation mode.
In COOL mode, the set temperature of the system is 24°C with auto fan speed. There are no timer and SLEEP modes.
In HEAT mode, the set temperature of the system is 24°C with auto fan speed. There are no timer and SLEEP modes.
Master unit that does not use an LCD 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.

D.10. Drain pump

Drain pump turns on if thermostat cut in during cooling or dehumidification cooling cycle. It will remain on for at least 5 minutes after thermostat cut out. During mode change from cooling to non-cooling mode, water pump will on for minimum 5 minutes.

D.11. Float switch

Float-switch open before turning on.
If float switch (N/C) is opened before the unit is turned on, If in Cool Mode MV1 / DA2 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 ≧5 seconds, 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. 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, system report error.

D.12. 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 Modbus 300020 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 Modbus 300020 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.13. 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 °C for 2 minutes

- MTV1 is turned ON,

- AUX2 is closed,
- DA2 is 5VDC.
- If Ti1 <5 °C for 2 minutes EH (if present) is switched on
- Indoor fan is turned on at low speed.

If Tr ≧ 5°C for 2 minutes
- MTV2 is OFF,
- AUX2 is open,
- DA2 is set to 0VDC.,
- Electric Heater is turned Off
- Indoor fan Switched OFF.

If 4-pipe unit is in Standby Mode
If Tr ≦ 2 °C for 2 minutes
- MTV2is turned ON.
- AUX2 is closed.
- DA3is 5VDC. if unit is with 6-way valve, DA2 is 8 VDC.
- If Ti1 <5 °C for 2 minutes EH (if present) is switched on.
- Indoor fan is turned on at low speed.

If Tr ≧ 5°C for 2 minutes
- MTV2 is OFF.
- AUX2 is open.
- DA3 is set to 0. if unit with 6-way valve, DA2 is 5 VDC.
- Electric Heater is turned off.
- Indoor fan is switched off.

D.14. Networking System

1) Disconnect the communication plug from the control box

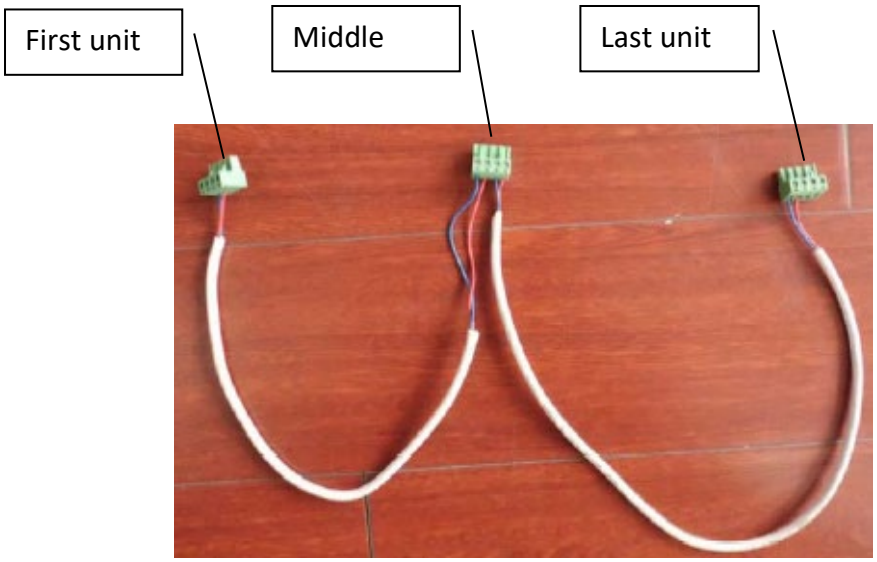
2) Communication plug

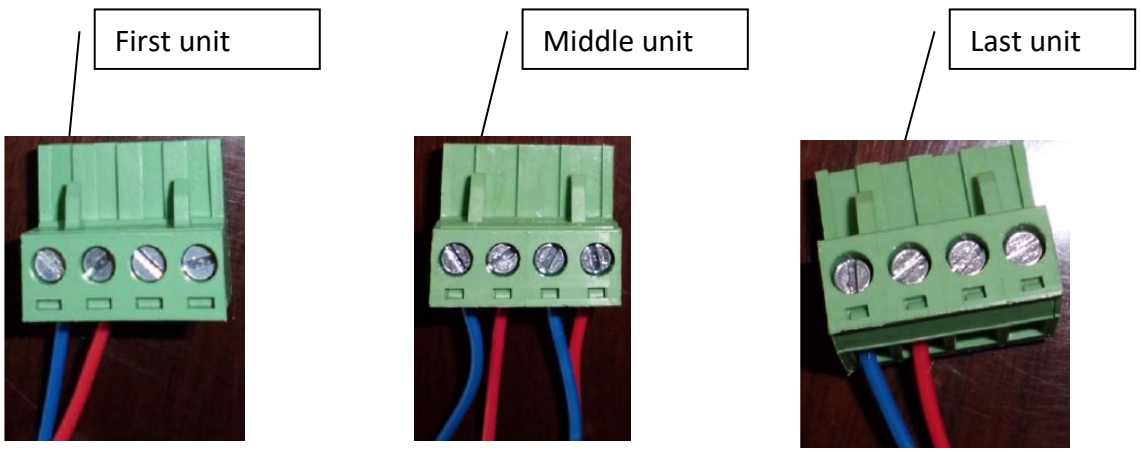
A, B, A, B is printed on the main PCB. When you connect the wires, please ensure connection of A to A and B to B.

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





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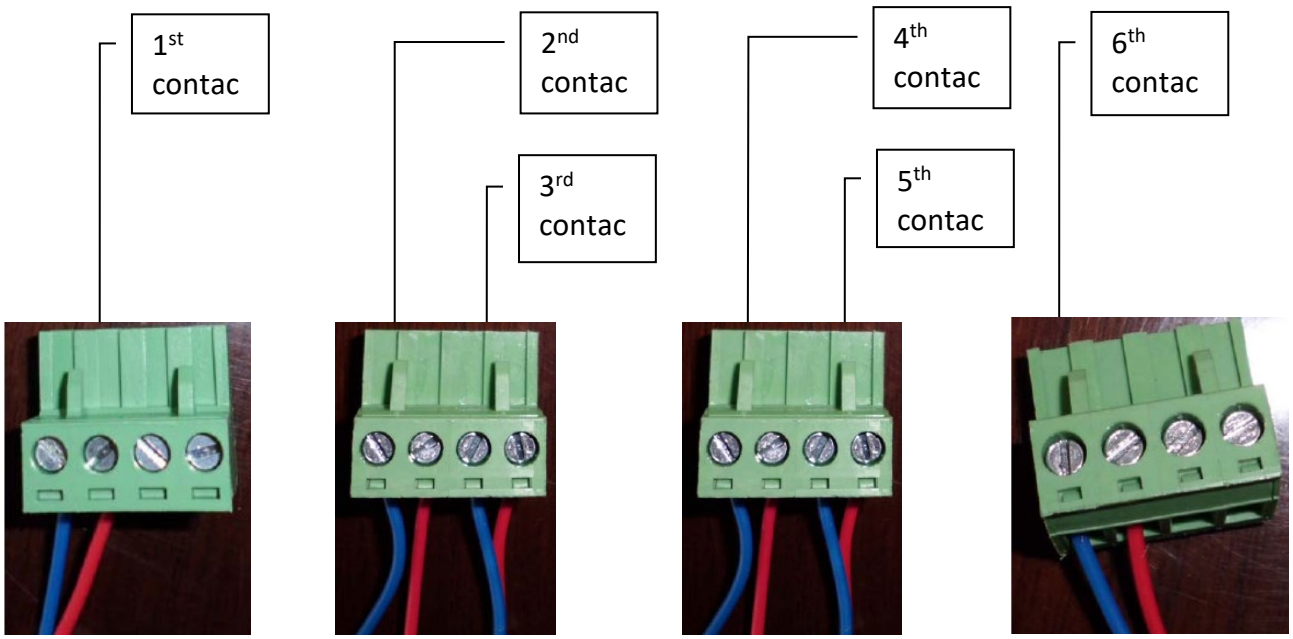
3.3) Wire connection check

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) Using wired wall pad or Modbus to set each unit address

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 between reading an answer and sending the next command of 80 ms.
All temperature is 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 is used to test.

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 succeed	Write data not succeed

Coils table:

Description	Address	Type*	Remark
ON/OFF	100000	R/W	
Sleeping mode	100001	R/W	
Louver swings	100002	R/W	
Energy Saving Mode	100003	R/W	
PRO function	100004	R/W	

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 outpuDA1	300015	R/W	Default 25% (2.5vdc)
Minimum output DA2	300016	R/W	Default 25% (2.5vdc)
Pre-heat temperature setting	300017	R/W	25~35, default: 30
Reserved-	300018	R/W	
Super low speed rpm	300019	R/W	
Low speed rpm	300020	R/W	
Medium speed rpm	300021	R/W	
High speed rpm	300022	R/W	
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, PHW-I) 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	
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	0~120, default: 80
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
Delt 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
DA2 Maximum opening setting	300086	R/W	0~100 Default: 100%

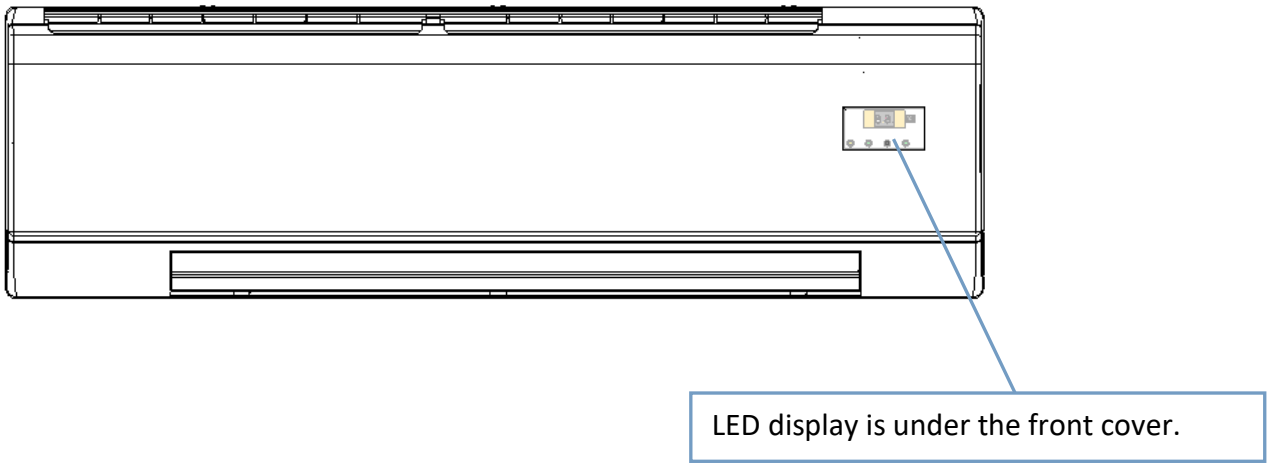
DA3 Maximum opening setting	300087	R/W	0~100 Default: 100%

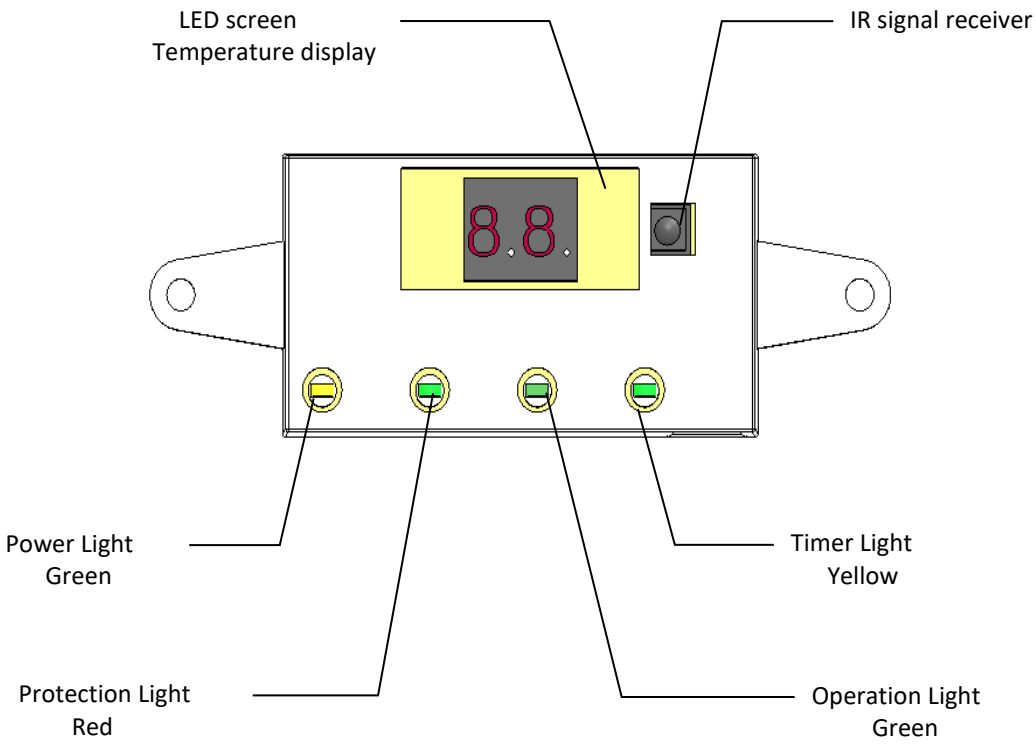
* R = read only, W = write only, R/W = read and write.

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 over heat 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	
DA2	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	400026~35	R	
EC motor1 actual RPM	400036	R	
EC motor2 actual RPM	400037	R	
EC motor1 error	400038	R	
EC motor2 error	400039	R	

D.16. LED Display and Error Description





Power / Operation LED light (both green)	
Unit on	Power LED Off, Operation LED On
Unit in standby	Power LED On, Operation LED Off

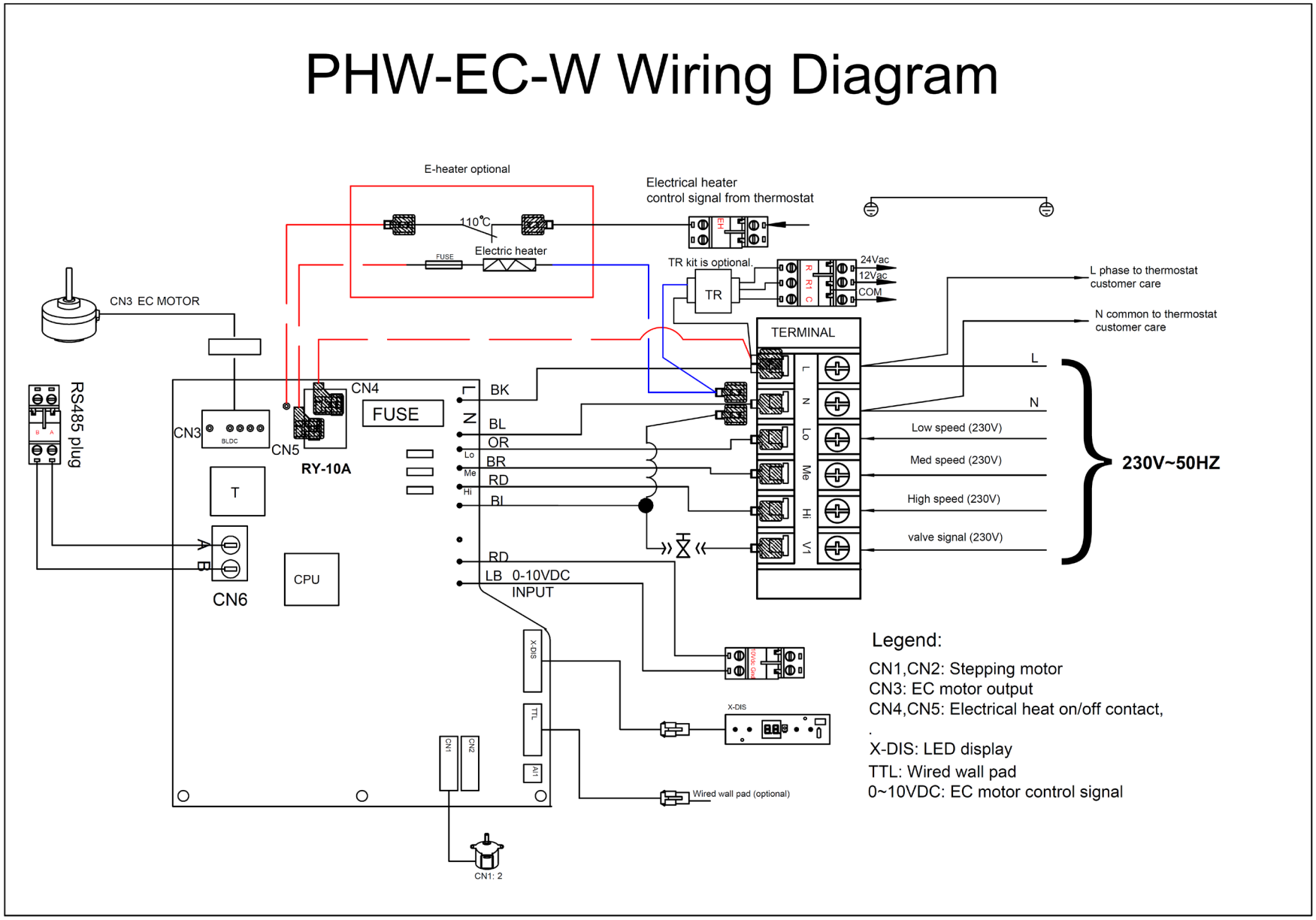
	For all units - Green LED			
Error Description	Blink	LED display	Reason	Remedy
Return air sensor failure	Green LED blinks 1 times, stops for 3s	E1	Room sensor unplugged or damaged.	1. Check if Tr plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil sensor 1 failure	Green LED blinks 2 times, stops for 3s	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	Green LED blinks 3 times, stops for 3s	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.
Water pump failure	Green LED blinks 4 times, stops for 3s	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	Green LED blinks 5 times, stops for 3s	E5	Water temperature is lower than 3 ^oC	Check the water temperature.
Indoor coil over heat protection	Green LED blinks 6 times, stops for 3s	E6	Water temperature is higher than 70 ^oC.	Check the water temperature
Filter Switch (S6 PCB)	Green LED blinks 7 times, stops for 3s	E7	Filter switch is opened.	1. Check if filter block or not 2. replace teh new filter
Electric Heater failure	Green LED blinks 8 times, stops for 3s	*E8*	*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	E9	No EC motor feedback	1. Check Modbus setting. 2. Check the EC motor.
EC motor failure(CN5)	Green LED blinks 10 times, stops 3s	E10	No EC motor feedback	1. Check Modbus setting. 2. Check the EC motor.
Anti-frozen protection	Green LED blinks 12 times, stops for 3s	E12	When unit is standby, Tr<2^{oC}.	1. Turn on unit to keep Tr high than 5^{o}C
Indoor coil sensor 3 failure (S6 PCB)	Green LED blinks 13 times, stops for 3s	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)	Green LED blinks 14 times, stops for 3s	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)	Green LED blinks 15 times, stops for 3s	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)	Green LED blinks 16 times, stops for 3s	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.

E. Control Specifications: Flexible Function PCB – W Type Control

E.1. I/O Port Definitions

I/O		Code	Descriptions
Analogue Input	Chilled water Sensor	AI1	Coil sensor (Ti1)
Power input	R1	Lo	230VAC input signals from wired thermostat.
	R2	Med	
	R3	Hi	
	EH	CN4	230VAC input signals from wired thermostat.
Power input	Phase	L	Power supply to the PCB and all the loads connected to the voltage outputs.
	Neutral	N	Power supply to the PCB and all the loads connected to the voltage outputs.
	Earth	⏚	Power supply to the PCB and all the loads connected to the voltage outputs.
Digital input	Wired wall pad	TTL	Adjust EC motor RPM
Signal input	Motor modulation signal: 0 to +5VDC or 0 to +10VDC	Signal	Standard configuration: 0 to +5VDC, S1 jumper on PCB is open. Optional configuration: 0~10VDC, S1 jumper on PCB is closed.
Output	EC motor	CN3	EC motor output
	Stepping motor	CN1, CN2	Stepping motor output
	Electric Heater Relay	CN5	When EH signal input is powered on and EC motor RPM>600rpm, EH output is turned on.
	LED Display	X-DIS	LED Display signal

E.2. Wiring diagram



E.3. Control Logic

Unit Power ON/OFF

a) The unit is turned ON when any of the fan speed inputs (H/M/L) are ON, or modulating signal input is more than 2.0VDC or Motor RPM writing (Modbus setting 30006) is above 200 RPM.
b) The unit is turned OFF only if all of the fan speed inputs (H/M/L) are OFF and modulating signal input is less than 2.0VDC and Motor RPM writing (Modbus setting 30006) is 0.

Alarm Protection and Error Display

a) If the float switch is open for 5 minutes or EC motor is failure, then the (NC) voltage-free alarm contact shall be open and the (NO) voltage free alarm contact shall be closed.
b) If the float switch is open for 10 minutes or EC motor is failure, the LED display reports a condensate management failure.

Louver Control

a) When the unit is OFF, the louvers are closed.
b) When the unit turns ON, the louvers open at optimum angle.
c) When the unit turns OFF, the louvers return to a closed position (100° against the vertical).

Modulating Signal Input

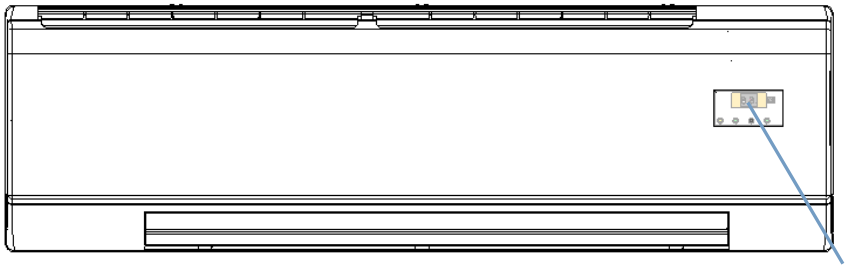
a) The standard configuration is for 0~5VDC modulating signal input.
b) The optional configuration is for 0~10VDC modulating signal. To set the PCB to the optional configuration, the S1 jumper must be closed.

Electrical Heater Operation

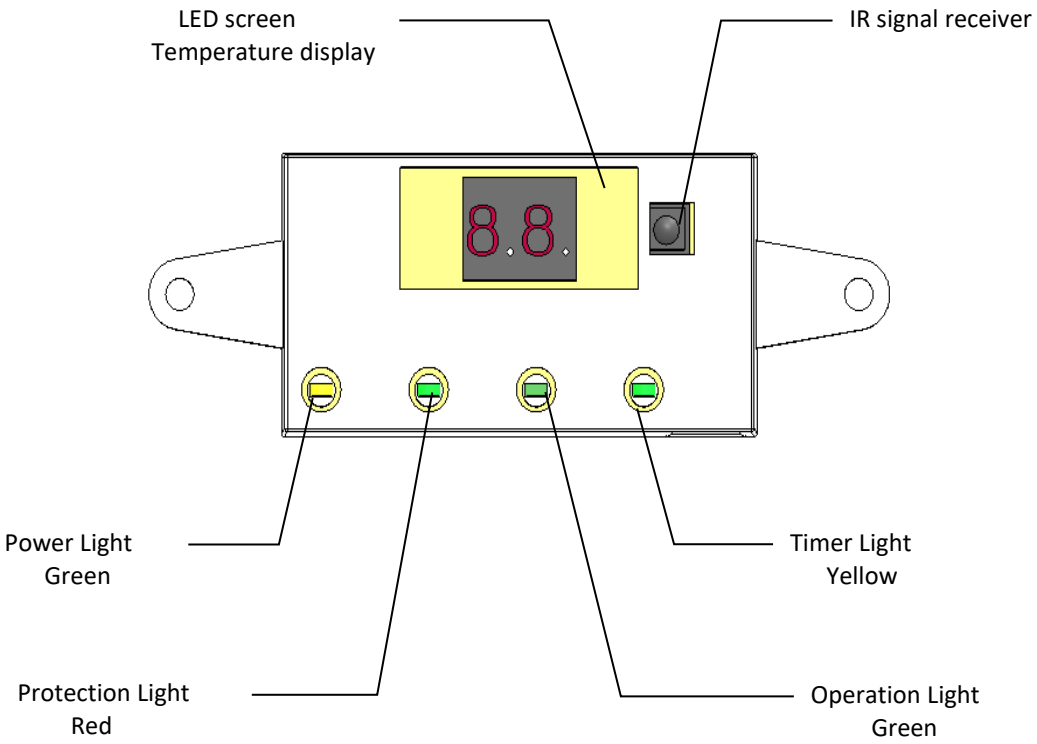
a) After unit is turned on, EH relay will be ON when EH signal is power on and EC motor RPM>300
b) If EC motor failure or EC motor RPM is lower than 300RPM, EH relay is open at once.

Low temperature protection of indoor coil in winter
When Modbus setting 30012=0, the function is able.
When Modbus setting 30012=1, the function is disable.
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 °C for 2 minutes, report error code and Buzzer is beeping.

E.4. LED display and Error Description



LED display is under the front cover.

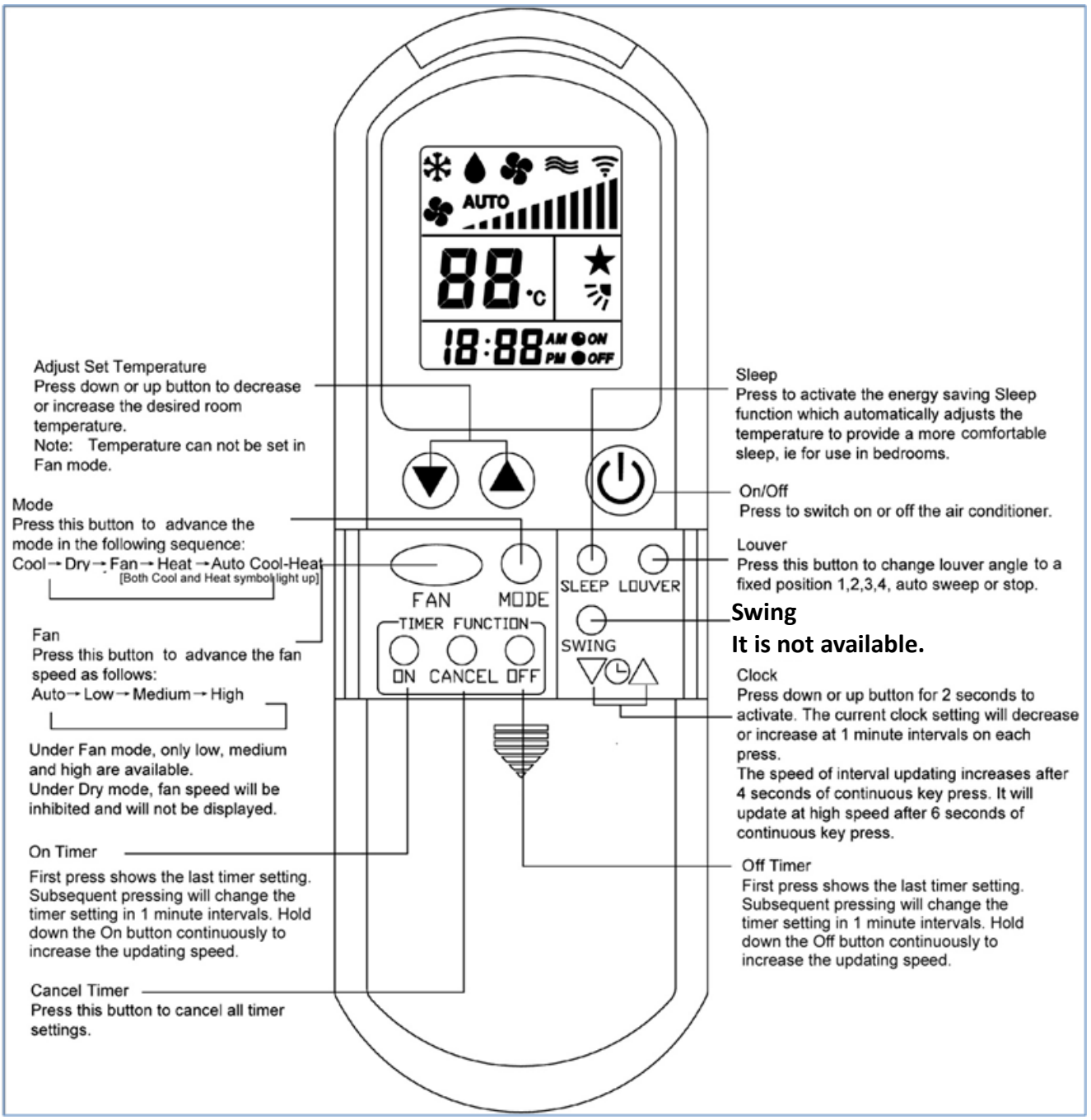


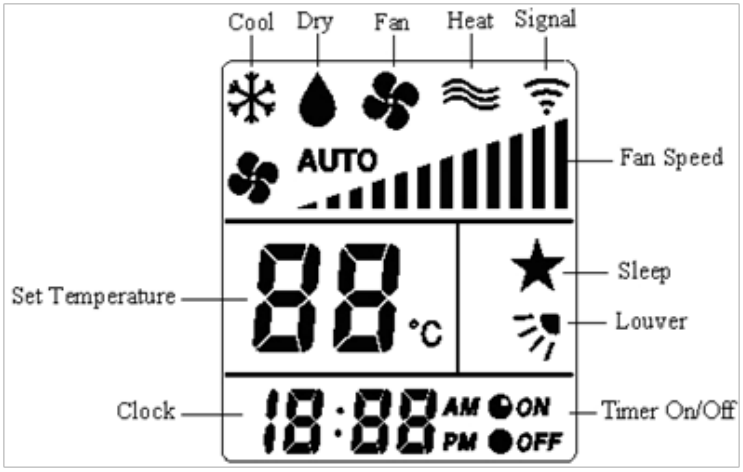
Power / Operation LED light (both green)	
Unit on	Power LED Off, Operation LED On
Unit in standby	Power LED On, Operation LED Off

For all units - Operation LED light (Green)				
Item	Blink	LED Display	Reason	Remedy
Indoor coil sensor 1 failure	Green LED blinks 4 times, stops for 3s	E4	Ti1 sensor connection is unplugged or damaged.	1. Check if Ti1 plug is connected or not. 2. Check if sensor's resistance is correct or not.
EC motor failure	Green LED blinks 9 times, stops for 3s	E9	No EC motor feedback	1. Check if EC motor's wires are connected. 2. Check the EC motor
Anti-frozen	Green LED blinks11 times, stops for 3s	E11	When unit is standby, Ti1<2°C.	1. Turn on unit to keep Ti1 high than 5°C

F. Users Interface

F.1. Remote Control Handset





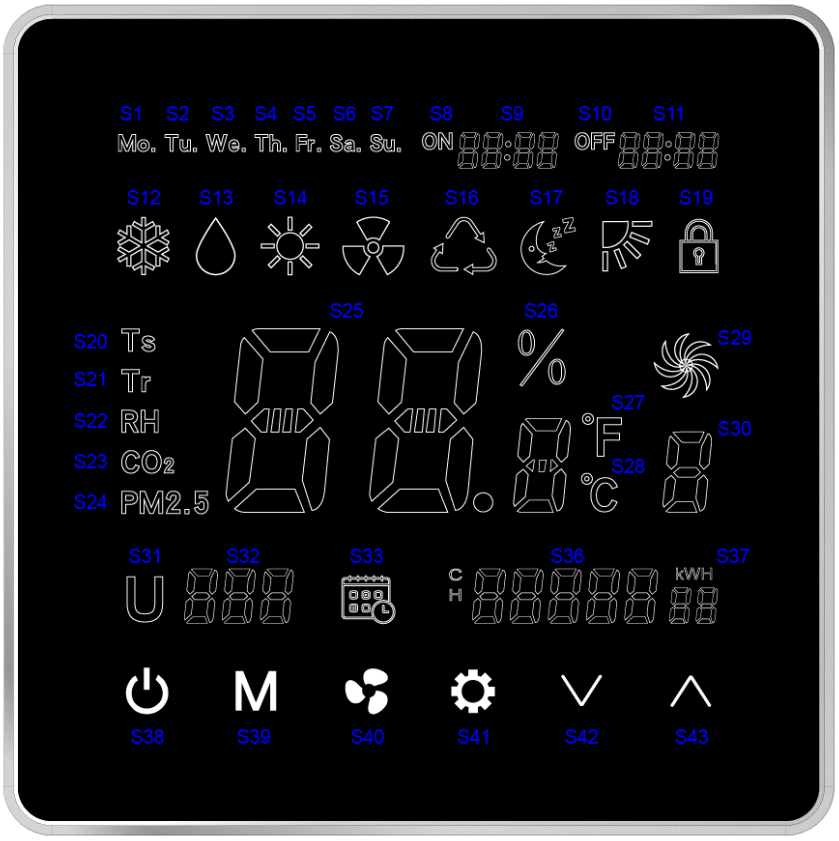
Attention

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

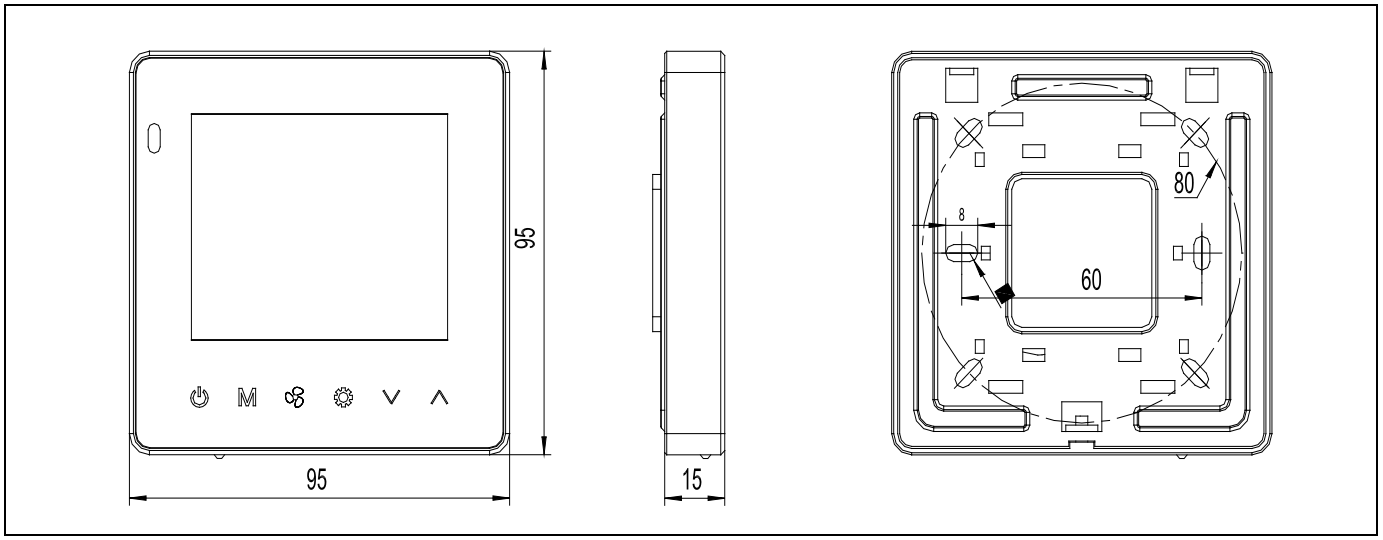
G. Wired Wall Pad Controller Operation Guide

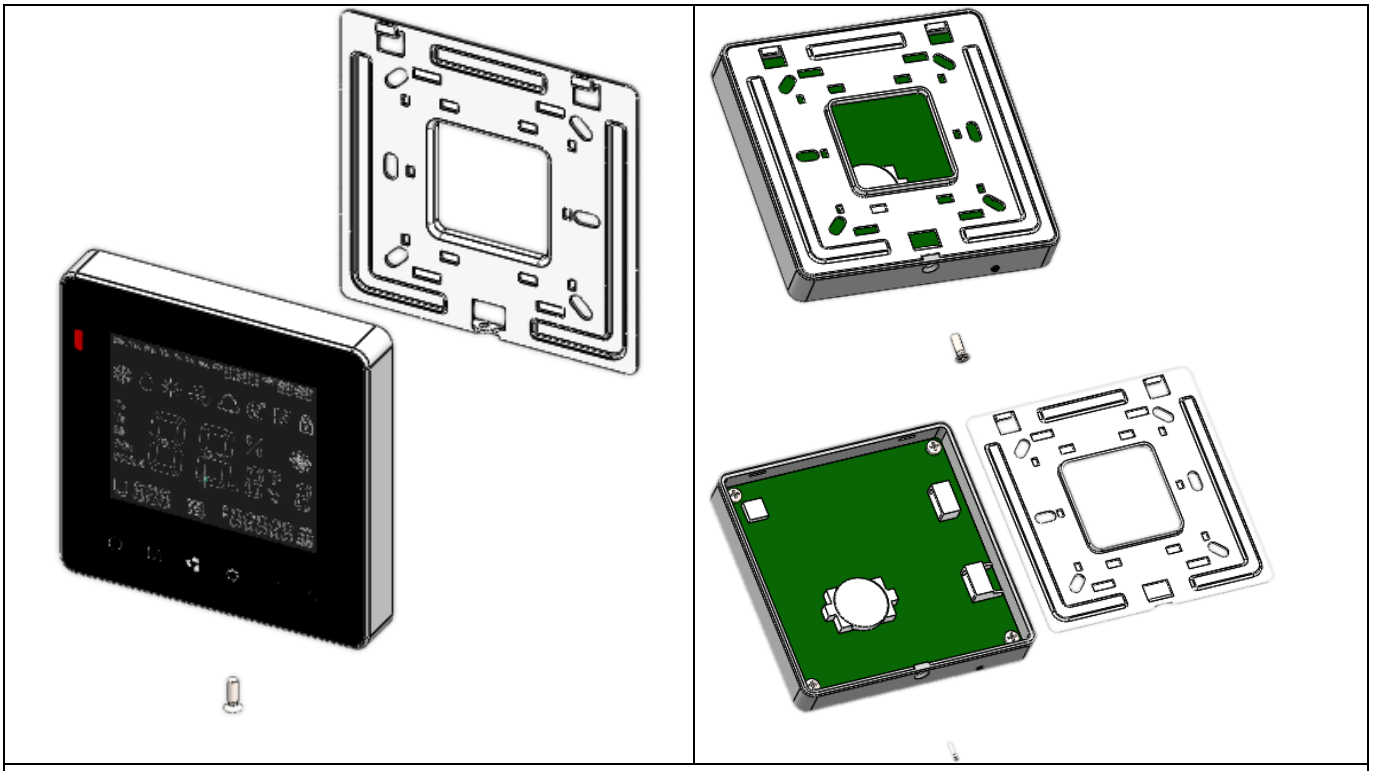
G.1. LED display



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

G.2. Dimensions and installation





Use screwdriver to remove the screw on the bottom

G.3. Operation guide

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 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. to set day of

Press  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.

Long press  for 5 seconds then short press it 6 times to set unit parameters (Professional Engineer)

U00 and 0000 appear.

0000 is password for below parameters reading or writing.

Password Setting:

Press  to select number position and Press  or  to increase or decrease number.

1111 is a default password for below parameter reading.
8888 is a default password for below parameter reading and setting.

Press  to read U001~U031 parameters.

Press  to set U001~U031 parameters and Press  or  to increase or decrease parameter setting.

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.

G.4. Error codes

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 °C.	Check the water temperature.
Indoor coil overheat protection	E6	Water temperature is higher than 70 °C.	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.
EC motor failure (CN4)	E9	No EC motor feedback	1. Check Modbus setting.
			2. Check the EC motor.
EC motor failure (CN5)	E10	No EC motor feedback	1. Check Modbus setting.
			2. Check the EC motor.
Motor qty setting error (S6 PCB)	E11	Motor Qty setting error	1: check Modbus setting
Anti-frozen protection	E12	When unit is standby, Tr<2°C.	1. Turn on unit to keep Tr high than 5°C
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

H. Sensor Resistance R-T Conversion Table

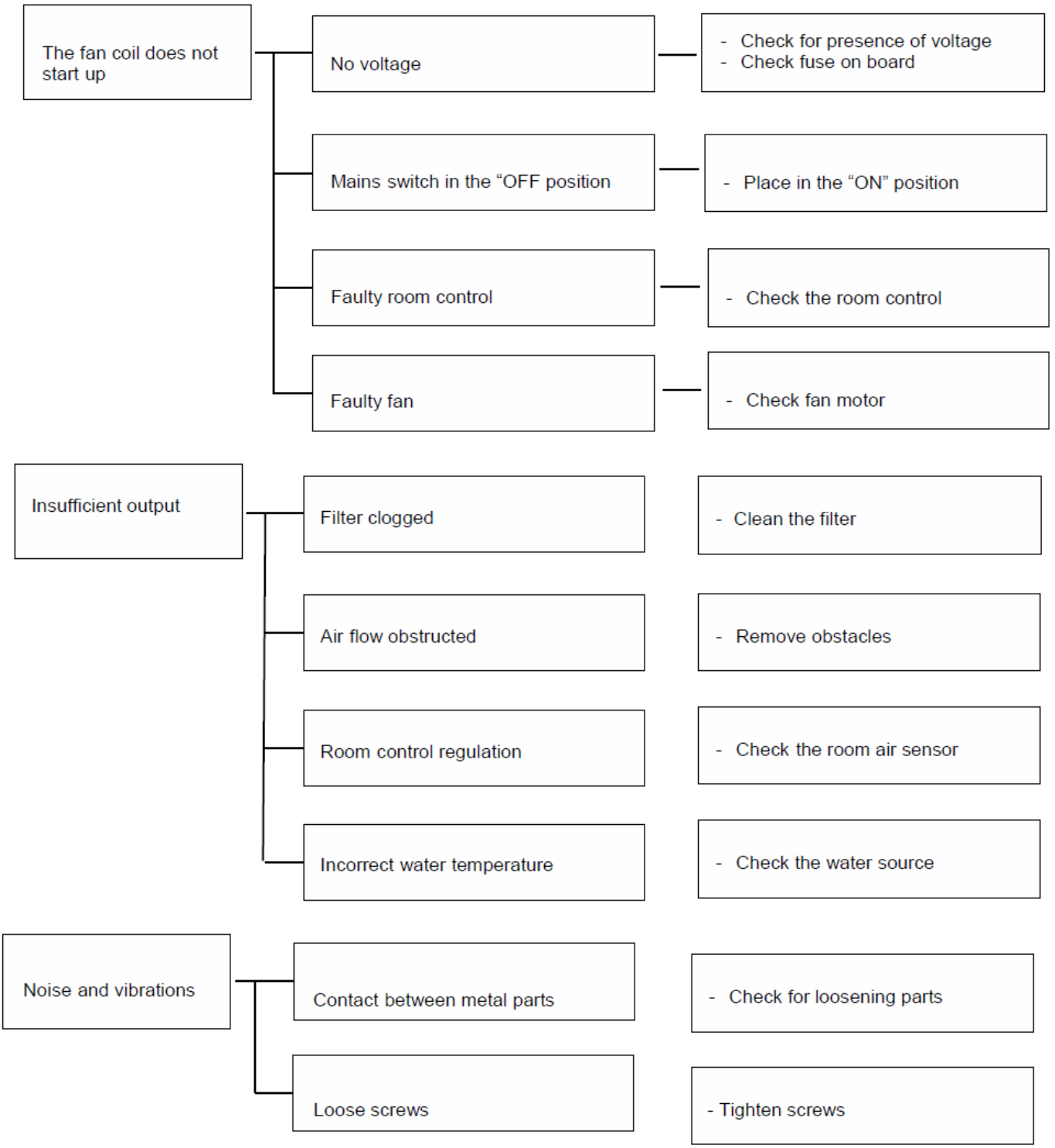
Resistance: R (25°C) = 10KΩ ± 1% Beta Constant: B (25/85) = 3977 ± 1%

Temp. (deg. C)	Rmax (kOhms)	Rnor (kOhms)	Rmin (kOhms)	Temp. (deg. C)	Rmax (k Ohms)	Rnor (kOhms)	Rmin (kOhms)
-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

Temp. (deg. C)	Rmax (k Ohms)	Rnor (k Ohms)	Rmin (k Ohms)	Temp. (deg. C)	Rmax (k Ohms)	Rnor (k Ohms)	Rmin (k Ohms)

40	5.4018	5.3146	5.2283	77	1.4137	1.3722	1.3317
41	5.1907	5.1049	5.0199	78	1.3681	1.3275	1.2880
42	4.9890	4.9045	4.8210	79	1.3243	1.2845	1.2458
43	4.7961	4.7130	4.6309	80	1.2820	1.2431	1.2053
44	4.6117	4.5300	4.4494	81	1.2413	1.2033	1.1663
45	4.4354	4.3551	4.2759	82	1.2021	1.1649	1.1287
46	4.2667	4.1878	4.1100	83	1.1644	1.1279	1.0926
47	4.1053	4.0278	3.9515	84	1.1279	1.0923	1.0577
48	3.9508	3.8748	3.7999	85	1.0928	1.0580	1.0241
49	3.8030	3.7283	3.6548	86	1.0590	1.0249	0.9918
50	3.6614	3.5882	3.5161	87	1.0264	0.9930	0.9606
51	3.5258	3.4540	3.3833	88	0.9949	0.9623	0.9306
52	3.3960	3.3255	3.2562	89	0.9646	0.9326	0.9016
53	3.2715	3.2025	3.1346	90	0.9353	0.9040	0.8737
54	3.1523	3.0846	3.0181	91	0.9070	0.8764	0.8468
55	3.0380	2.9717	2.9065	92	0.8797	0.8498	0.8208
56	2.9285	2.8635	2.7996	93	0.8534	0.8241	0.7958
57	2.8234	2.7597	2.6972	94	0.8280	0.7994	0.7716
58	2.7227	2.6603	2.5990	95	0.8035	0.7754	0.7483
59	2.6260	2.5649	2.5049	96	0.7798	0.7523	0.7258
60	2.5333	2.4734	2.4147	97	0.7569	0.7300	0.7041
61	2.4443	2.3856	2.3282	98	0.7348	0.7085	0.6831
62	2.3589	2.3014	2.2452	99	0.7134	0.6877	0.6628
63	2.2768	2.2206	2.1656	100	0.6928	0.6676	0.6433
64	2.1981	2.1431	2.0892	101	0.6728	0.6482	0.6244
65	2.1224	2.0686	2.0159	102	0.6536	0.6295	0.6062
66	2.0498	1.9970	1.9455	103	0.6349	0.6113	0.5885
67	1.9800	1.9283	1.8779	104	0.6169	0.5938	0.5715
68	1.9129	1.8623	1.8130	105	0.5995	0.5769	0.5550
69	1.8484	1.7989	1.7507	106	0.5826	0.5605	0.5391
70	1.7864	1.7380	1.6908	107	0.5663	0.5447	0.5237
71	1.7267	1.6794	1.6332	108	0.5506	0.5293	0.5089
72	1.6694	1.6231	1.5779	109	0.5353	0.5145	0.4945
73	1.6142	1.5689	1.5247	110	0.5206	0.5002	0.4806
74	1.5612	1.5168	1.4736	111	0.5063	0.4863	0.4671
75	1.5101	1.4667	1.4245	112	0.4924	0.4729	0.4541
76	1.4610	1.4185	1.3772	113	0.4791	0.4599	0.4415

I. Troubleshooting Guide



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

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