POLAR AIR

INSTALLATION, OPERATION AND SERVICE MANUAL

PFWSL-V/P-EC

SLIM FLOORSTANDING

Cooke Industries - Phone: +64 9 579 2185 Email: sales@cookeindustries.co.nz Web: www.cookeindustries.co.nz

INVESTING IN QUALITY, RELIABILITY & PERFORMANCE

ISO 9001 QUALITY

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

CESAFETY STANDARDS

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.

EUROVENT CERTIFICATION

WEEEMARK

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, products ranges have CE safety approval. AHRI certified performance 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.

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Model Code Nomenclature

PFWSL - 01 - V I - ECM

ECM	EC Motor Configuration

I	Complete controller with VAV&VWV control logic
W	EC motor driver suitable for connection to AC or EC modulating thermostat

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

01 – 05	Unit Sizes. See General Specification section A for cooling and heating capacities

PFWSL	Super Slim Universal Unit

A. Technical Data

A.1. General Description

The product represents all-in-one solution for cooling, heating and dehumidification. It achieves high energy saving levels as it can be combined with low-temperature heat generators such as heat pump, condensing boilers and solar collectors. With its sophisticated temperature regulator, it guarantees thermal comfort in every season. It heats and cools extremely quickly and once the desired temperature is reached it maintains it accurately and silently.

STRUCTURE
The bearing structure is made of galvanized sheet-steel with holes for attaching the structure to the wall/ceiling.Fire resistant insulation is fitted internally to provide both thermal and acoustic insulation.

FASCIA
The RAL9010 fascia is made of steel-sheet with electrostatic coating which is resistant to rust, corrosion, chemical agents, solvents, aliphatic compounds and alcohols.

AIR DELIVERY GRILLE
The air delivery grill is made from Aluminum, which color is RAL9002.

HEAT EXCHANGER
The heat exchanger is a highly efficient coil in which copper pipes and aluminum fins are fixed by mechanical expansion. Coil connections are provided with an anti-torsion system, hand air vent and water purge valves.
Coils are tested at the pressure of 25 bar and recommended for operating at 8 bar.

Blower and Motor
TheunitincorporatesonlyspeciallydesignedandtestedEC motors, allowing the blower wheel to provide optimum performance in airflow-efficiency and quiet operation.

AIR FILTER
The air filter is made of Nylon filter. It is easy to removing and cleaning, which can be cleaned by rinsing with water or by gently vacuuming it.

Microprocessor control (I control)

The main design features include:
~ 2-pipe, 2-pipe with booster electric heat, 2-pipe with primary electric heat, 4-pipe with 6 way valve installed.
~ 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.
~ 2-way and 3-way on/off or modulating valve control.
~ Wired wall pad controller (optional)
~ Manual control panel in cabinet.
~ Auxiliary switch for cooling and heating signal.
~ 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 △t, to ensure the correct heat transfer from the water to the air. Constant △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 is from R and C or from indoor room to terminal H/M/L supplies power to limited PCB. When any of H/M/L is powered ON or 0~10Vdc input is more than 2.5 Vdc, the unit is ON. When all of H/M/L is powered OFF and 0~10Vdc input is 0 Vdc, the unit is OFF. 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, which is used to supply 24Vac power to thermostat and modulating valve.

A.2. General Specification

A.2.1. 2-Pipe Systems

Product range: PFWSL-ECM Super Slim Universal Fan Coil with EC Motor

PFWSL-V~-ECM Super Slim Universal Unit 2-pipe with EC Motor

PFWSL-[Size]-V~-ECM					1	2	3	4	5
Unit Configuration		Configuration			2-pipe				
		Number Of Fan Blowers			Single			Twin	
		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	180	295	380	460	600
			M		140	245	330	370	500
			L		100	170	230	260	350
	Cooling	Cooling Capacity[e]	H	kW	1.2	1.98	2.65	3.2	4.17
			M		0.99	1.72	2.38	2.73	3.64
			L		0.77	1.3	1.79	2.06	2.77
		Sensible Cooling Capacity[e]	H		0.83	1.37	1.82	2.2	2.87
			M		0.68	1.18	1.62	1.86	2.48
			L		0.52	0.88	1.2	1.39	1.86
		Latent Cooling Capacity	H		0.37	0.61	0.83	1	1.3
			M		0.31	0.54	0.76	0.87	1.16
			L		0.25	0.42	0.59	0.67	0.91
		FCEER [e]			76.56	115.87	143.57	160.97	205.36
		FCEER class [e]			D	C	B	B	A
	Heating	Heating Capacity[e]	H	kW	1.16	1.9	2.49	3.02	3.9
			M		0.96	1.66	2.26	2.58	3.42
			L		0.74	1.25	1.71	1.96	2.62
		FCCOP [e]			73.85	111.69	137.20	153.76	196.19
		FCCOP class [e]			D	C	C	C	B
		Max. Electric Heater Capacity		kW	0.75	1	1	1.5	1.5
	Sound	Sound Pressure Level (Outlet)		dB(A)	43/37/29	43/38/30	45/43/31	46/42/33	47/42/33
		Sound Power Level (Outlet)[e]			52/46/38	52/47/39	54/52/40	55/51/42	56/51/42
	Electrical	Fan Motor Power [e]	H	W	16	19	22	24	26
			M		13	15	17	18	20
			L		10	11	12	12	12
		Fan Motor Running Current @ H		A	0.14	0.17	0.2	0.22	0.24
	Hydraulic	Cooling Water Flow Rate	H	L/h	207	339	454	548	715
			M		171	295	408	469	624
			L		131	223	306	354	474
		Cooling Pressure Drop [e]	H	kPa	26.3	27.9	57.7	44.2	81.9
			M		18.6	21.6	47.6	33.3	64.1
			L		11.7	13	28.4	20.1	39.1
		Heating Water Flow Rate	H	L/h	199	326	426	518	669
			M		165	285	388	443	587
			L		127	214	294	336	450
		Heating Pressure Drop [e]	H	kPa	20.4	21.4	43.1	33.1	60.9
			M		14.5	16.8	36.4	24.9	48.1
			L		9.1	10.1	22	15.1	29.8
		Water Content		L	0.32	0.52	0.73	0.94	1.14
Construction and Packing Data		Water Connections	Type		Socket (Threader Female)				
			In	mm[in]	12.7 [1/2]				
			Out						
		Condensate Drainage Connection			16 [5/8]				
		Dimensions	L	mm	735	935	1135	1335	1535
			W		135	135	135	135	135
			H		582	582	582	582	582
		Net Weight		kg	19	22	25	28	31

"*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: PFWSL-P~-ECM Super Slim Universal Unit 4-pipe with EC Motor

PFWSL-P~-ECM Super Slim Universal Unit 4-pipe with EC Motor

PFWSL-[Size]-P~-ECM					01	02	03	04	05
Unit Configuration		Configuration			2-pipe				
		Number Of Fan Blowers			Single			Twin	
		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	180	295	380	460	600
			M		140	245	330	370	500
			L		100	170	230	260	350
	Cooling	Cooling Capacity	H	kW	0.89	1.51	2	2.46	3.19
			M		0.74	1.31	1.8	2.06	2.78
			L		0.56	0.98	1.35	1.59	2.11
		Sensible Cooling Capacity	H		0.63	1.06	1.4	1.72	2.24
			M		0.52	0.91	1.25	1.43	1.93
			L		0.39	0.67	0.93	1.08	1.45
	Heating	Heating Capacity	H	kW	1.05	1.75	2.30	2.80	3.62
			M		0.86	1.51	2.06	2.38	3.16
			L		0.67	1.15	1.55	1.82	2.40
	Sound	Sound Pressure Level (Outlet)		dB(A)	43/37/29	43/38/30	45/43/31	46/42/33	47/43/33
		Sound Power Level (Outlet)			52/46/38	52/47/39	54/52/40	55/51/42	56/52/42
	Electrical	Fan Motor Power	H	W	16	19	22	24	26
			M		13	15	17	18	20
			L		10	11	12	12	12
		Fan Motor Running Current @ H		A	0.14	0.17	0.2	0.22	0.24
	Hydraulic	Cooling Water Flow Rate	H	L/h	152	258	344	422	547
			M		126	224	309	354	477
			L		97	168	232	273	362
		Cooling Pressure Drop	H	kPa	11.0	36.7	25.0	19.4	35.8
			M		7.9	28.4	20.6	14.1	28.0
			L		4.9	16.9	12.3	8.9	17.0
		Heating Water Flow Rate	H	L/h	90	150	197	240	310
			M		74	130	177	204	271
			L		57	98	133	156	206
		Heating Pressure Drop	H	kPa	10.4	35.2	72.7	17.9	33.2
			M		7.4	27.1	59.6	13.3	26.1
			L		4.6	16.4	35.8	8.2	15.9
		Chilled Water Content		L	0.2327	0.3781	0.5309	0.6836	0.8291
		Hot Water Content		L	0.0873	0.1419	0.1991	0.2564	0.3109
Construction and Packing Data		Water Connections	Type		Socket (Threader Female)				
			In	mm[in]	12.7 [1/2]				
			Out						
		Condensate Drainage Connection			16 [5/8]				
		Dimensions	L	mm	735	935	1135	1335	1535
			W		135	135	135	135	135
			H		582	582	582	582	582
		Net Weight		kg	19	22	25	28	31

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

A.3.1. 2-Pipe Systems

Model	Fin height (mm)	Fin Length (mm)	Fins per inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
PFWSL-01	336	289	19.5	2.75	51	2	7
PFWSL-02		489				3	
PFWSL-03		689				3	
PFWSL-04		889				4	
PFWSL-05		1089				6	

A.3.2. 4-Pipe Systems

Cooling Coil

Model	Fin height (mm)	Fin Length (mm)	Fins per inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
PFWSL-01	336	289	19.5	2	34	2	7
PFWSL-02		489				3	
PFWSL-03		689				3	
PFWSL-04		889				4	
PFWSL-05		1089				6	

Heating Coil

Model	Fin height (mm)	Fin Length (mm)	Fins per inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
PFWSL-01	336	289	19.5	0.75	17	1	7
PFWSL-02		489				1	
PFWSL-03		689				1	
PFWSL-04		889				2	
PFWSL-05		1089				2	

A.4. Sound power data

Model		PFWSL-01-ECM									
speed		500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM
Sound Power dB(A)		**30.4**	**33.4**	**34.2**	**38.2**	**40.5**	**44.3**	**46.1**	**49.9**	**51.6**	**53.7**
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	**20.0**	8.0	2.6	2.9	-4.5	9.8	3.9	0.5	2.7	0.3	2.3
	25.0	10.2	9.5	9.2	5.3	8.1	13.4	4.2	2.0	-0.2	7.4
	31.5	3.5	2.9	12.1	5.2	12.2	11.3	6.5	3.2	2.7	11.4
	40.0	3.2	6.2	14.5	7.8	14.0	11.5	1.9	9.0	11.1	11.4
	50.0	12.8	14.3	10.2	6.8	10.9	13.2	15.2	11.5	7.2	14.1
	63.0	9.2	3.8	7.4	5.4	11.9	11.0	8.9	9.1	10.2	16.4
	80.0	9.3	9.3	9.4	8.8	9.0	9.4	13.3	11.9	14.8	12.7
	100.0	9.3	5.3	8.7	6.5	5.3	9.2	9.8	9.2	13.9	13.9
	125.0	8.2	4.1	10.9	6.8	9.2	12.1	12.5	14.2	20.8	23.3
	160.0	7.8	7.3	12.6	16.7	22.4	17.3	22.3	25.9	25.9	29.0
	200.0	23.5	17.7	20.1	24.2	29.7	35.6	37.7	35.8	37.4	37.8
	250.0	22.8	30.0	30.8	36.0	34.9	38.7	40.6	46.8	46.2	49.8
	315.0	16.4	18.3	22.4	24.7	27.3	30.6	32.2	36.3	37.1	41.2
	400.0	14.6	18.6	21.7	26.5	27.0	31.4	34.0	36.6	37.3	38.6
	500.0	12.8	17.4	20.3	26.3	28.5	29.0	32.5	34.8	37.4	37.5
	630.0	14.5	18.0	20.9	24.6	29.4	32.5	34.6	37.4	39.1	40.5
	800.0	13.5	16.7	19.9	25.5	28.7	32.9	34.5	37.7	40.8	42.2
	1000.0	14.1	16.6	19.8	26.4	29.2	32.6	35.4	39.8	42.2	41.9
	1250.0	15.5	16.8	19.5	23.9	27.1	30.6	34.0	36.6	39.3	40.1
	1600.0	14.8	16.4	19.3	25.5	26.3	29.8	32.7	37.3	39.6	42.3
	2000.0	15.9	17.1	19.2	25.1	27.5	29.9	32.3	35.9	39.4	41.2
	2500.0	17.1	17.0	17.8	20.5	23.6	26.3	28.8	32.8	35.2	36.6
	3150.0	15.5	15.9	16.5	18.8	21.6	25.0	28.2	32.2	34.4	36.4
	4000.0	15.9	16.1	16.4	18.0	19.1	22.3	24.3	28.0	30.9	32.8
	5000.0	16.1	16.3	16.3	16.7	18.0	19.5	21.6	25.2	28.0	29.9
	6300.0	15.9	16.8	15.9	17.1	16.8	18.0	20.1	23.6	26.4	29.2
	8000.0	15.4	15.4	15.1	15.4	15.2	15.5	16.3	17.9	19.4	21.9
	10000.0	13.2	12.9	13.1	13.4	13.1	13.7	14.0	16.0	17.8	19.9
	12500.0	9.5	9.5	9.5	9.6	9.6	9.6	9.8	9.9	10.4	11.2
	16000.0	9.8	10.5	11.3	12.1	12.6	12.0	11.5	11.0	11.0	10.4

Model		PFWSL-02-ECM									
speed		500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM
Sound Power dB(A)		**30.3**	**33.4**	**34.1**	**38.8**	**40.6**	**44.4**	**46.9**	**49.2**	**51.5**	**53.7**
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	**20.0**	7.0	9.2	1.9	6.4	4.8	2.0	3.2	6.5	3.9	-0.9
	25.0	12.9	13.3	13.3	12.8	15.7	10.7	8.3	11.0	12.6	9.4
	31.5	7.2	4.8	5.2	11.3	5.5	0.6	1.7	4.3	6.4	2.8
	40.0	9.6	12.8	9.0	11.2	3.7	9.9	5.5	9.8	7.9	10.0
	50.0	11.0	12.5	10.7	12.7	12.7	9.5	14.4	15.5	9.4	13.1
	63.0	6.9	9.7	4.3	8.9	7.7	10.0	9.5	8.8	10.0	11.4
	80.0	9.5	8.3	9.5	9.2	9.5	12.6	10.9	13.6	11.7	9.9
	100.0	9.0	10.3	5.3	9.2	10.6	11.6	10.2	14.5	10.3	12.3
	125.0	4.7	10.6	9.0	9.7	10.0	11.5	13.9	15.3	17.2	22.5
	160.0	9.0	10.0	15.7	32.1	24.4	22.3	23.9	26.0	24.6	27.6
	200.0	21.8	20.7	23.1	28.0	31.0	33.1	36.6	35.8	38.9	41.9
	250.0	23.9	30.2	30.4	34.1	34.4	42.2	42.8	44.4	45.2	47.6
	315.0	18.0	19.4	22.0	26.0	29.9	34.2	35.0	37.4	37.4	39.3
	400.0	13.9	19.6	23.9	26.3	28.8	30.9	31.3	36.5	37.9	40.9
	500.0	13.6	17.5	22.3	24.1	29.2	31.0	32.1	36.3	37.7	38.4
	630.0	14.5	17.8	21.4	24.0	30.4	34.3	36.8	38.7	41.8	44.8
	800.0	16.1	16.4	20.6	23.6	28.0	31.7	34.1	37.4	40.5	43.3
	1000.0	14.8	16.1	20.5	23.2	28.1	31.7	34.3	38.0	39.9	41.9
	1250.0	15.9	17.4	21.3	23.1	27.6	31.1	33.6	37.0	40.0	41.1
	1600.0	15.7	16.7	18.3	21.2	26.5	30.3	34.2	36.0	39.3	42.1
	2000.0	15.6	16.6	18.7	21.0	26.7	30.5	34.5	37.2	40.2	42.7
	2500.0	17.5	19.1	20.0	21.4	24.0	27.0	29.6	32.2	35.7	38.3
	3150.0	16.1	16.9	17.5	18.2	21.1	24.4	27.7	31.2	34.4	36.5
	4000.0	16.2	16.4	16.7	17.6	19.0	21.0	25.1	26.8	30.2	32.6
	5000.0	17.0	17.2	16.6	17.3	18.2	20.7	22.2	24.6	27.0	30.1
	6300.0	16.5	16.9	16.9	17.2	17.8	18.8	21.0	23.2	26.2	28.5
	8000.0	16.0	16.0	15.4	15.4	15.3	17.2	17.1	17.9	19.3	21.3
	10000.0	14.0	14.4	13.6	13.9	13.9	15.7	15.0	16.2	17.6	19.5
	12500.0	11.2	10.8	9.8	9.7	9.7	11.7	10.7	11.4	11.5	12.2
	16000.0	11.9	7.2	7.4	7.8	8.1	8.6	8.2	8.4	8.2	8.7

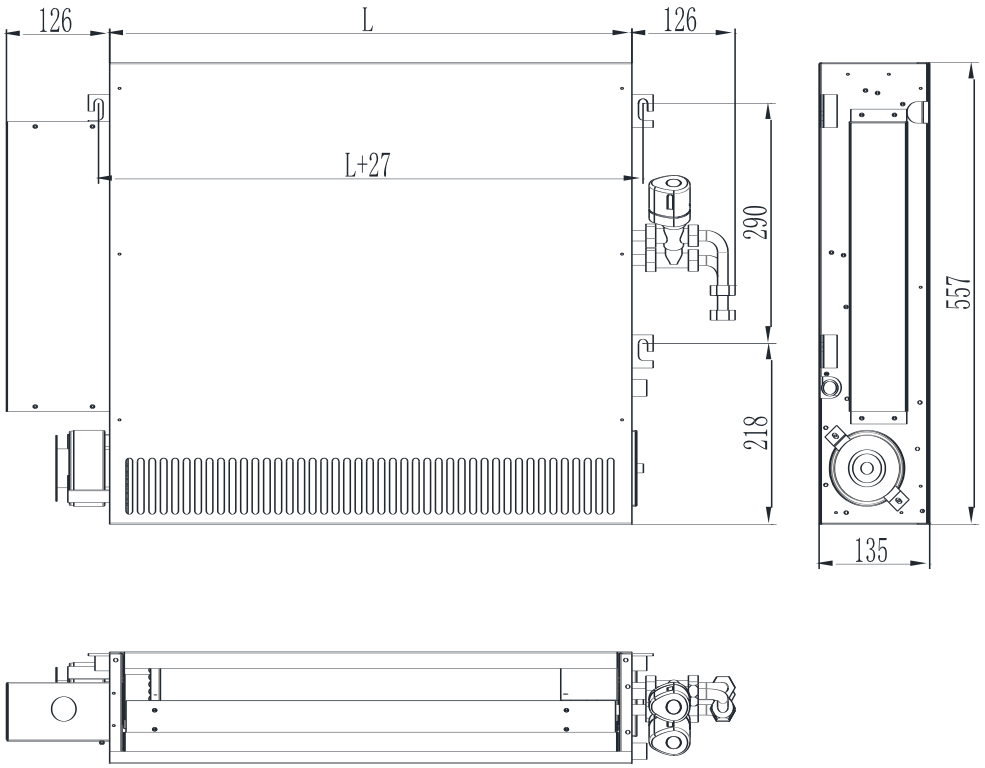
Model		PFWSL-03-ECM									
speed		500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM
Sound Power dB(A)		**37.1**	**38.5**	**39.3**	**40.2**	**42.9**	**47.9**	**51.7**	**52.9**	**53.8**	**56.4**
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	**20.0**	-0.8	3.7	-3.3	5.7	7.6	3.5	1.6	-2.0	0.3	2.8
	25.0	21.7	8.8	13.5	21.7	22.3	21.1	12.4	22.8	9.5	9.5
	31.5	6.6	11.5	15.5	14.3	6.4	2.0	11.8	12.5	9.8	20.6
	40.0	7.1	6.4	8.8	11.0	14.0	8.9	11.6	9.8	8.2	11.4
	50.0	10.9	15.7	8.2	10.8	14.3	11.7	9.7	9.1	16.9	16.6
	63.0	1.6	7.5	11.7	10.6	13.8	11.1	12.0	13.3	17.9	19.6
	80.0	12.6	11.5	13.2	8.8	16.5	19.4	8.6	17.8	13.5	13.9
	100.0	9.7	11.8	13.2	12.8	11.7	11.3	15.5	13.4	17.1	16.0
	125.0	16.8	14.7	17.1	13.6	20.1	15.5	25.9	19.4	22.2	26.8
	160.0	12.3	10.9	15.4	20.2	21.3	22.1	24.5	27.8	27.2	31.8
	200.0	36.1	24.9	27.2	29.8	30.0	42.7	47.7	40.2	39.6	45.5
	250.0	22.6	37.1	35.9	35.7	37.9	41.8	45.7	44.6	48.4	50.3
	315.0	16.9	22.3	29.7	28.6	30.9	34.1	35.5	38.4	41.9	45.4
	400.0	16.3	19.7	24.5	28.2	30.3	33.5	35.2	37.6	41.1	40.8
	500.0	13.7	18.2	22.2	27.5	29.6	32.3	35.7	36.8	39.5	41.0
	630.0	14.1	20.0	24.5	27.9	30.7	34.3	38.0	41.2	44.0	48.4
	800.0	13.9	17.2	23.3	27.0	30.6	34.0	37.1	40.2	45.1	44.6
	1000.0	15.2	18.1	23.4	28.8	31.4	35.3	38.3	40.8	45.3	44.9
	1250.0	15.9	19.1	22.0	27.4	29.6	34.2	36.7	39.6	42.7	43.8
	1600.0	16.0	17.2	20.5	26.1	29.1	33.5	36.2	41.2	41.3	44.1
	2000.0	15.3	16.7	19.7	25.0	28.9	33.7	36.5	39.2	42.5	45.2
	2500.0	15.7	16.6	18.3	21.1	24.2	28.5	32.0	35.2	37.4	40.2
	3150.0	15.6	15.5	17.0	20.0	23.6	28.2	31.3	35.5	37.7	40.0
	4000.0	16.5	16.3	17.2	18.9	20.5	24.2	27.2	30.8	33.4	36.1
	5000.0	15.9	16.3	16.4	17.1	18.1	21.3	23.8	28.1	31.6	34.4
	6300.0	15.9	16.0	16.2	16.9	17.7	19.3	22.8	26.1	29.0	32.3
	8000.0	14.5	14.8	14.7	14.9	15.0	15.3	16.2	18.7	21.2	24.0
	10000.0	13.0	13.0	13.2	13.3	13.5	13.8	14.4	16.7	18.9	22.0
	12500.0	9.5	9.4	9.7	9.6	9.5	9.6	9.8	10.2	10.9	12.2
	16000.0	7.1	7.5	7.5	7.6	8.0	7.7	8.1	8.0	8.6	8.7

Model		PFWSL-04-ECM									
speed		**500RPM**	**600RPM**	**700RPM**	**800RPM**	**900RPM**	**1000RPM**	**1100RPM**	**1200RPM**	**1300RPM**	**1400RPM**
Sound Power dB(A)		**32.5**	**37.5**	**38.0**	**41.5**	**44.8**	**48.2**	**50.5**	**53.2**	**55.4**	**57.1**
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	**20.0**	-4.1	-4.9	-3.1	2.1	6.5	4.3	**1.0**	1.8	2.1	-5.4
	25.0	6.2	5.1	5.1	4.8	12.9	12.0	14.6	13.6	11.3	6.3
	31.5	0.7	3.6	-1.3	12.4	9.3	3.2	4.3	1.7	2.7	0.7
	40.0	7.8	4.8	7.1	12.9	11.2	10.1	4.9	7.8	8.8	5.9
	50.0	14.4	12.0	18.0	18.7	15.2	20.2	13.6	15.8	16.5	15.3
	63.0	1.7	7.9	3.6	13.4	9.5	12.9	12.1	13.5	16.7	14.5
	80.0	0.4	8.9	10.1	10.1	8.8	10.3	12.4	19.8	20.1	16.8
	100.0	6.3	5.9	8.9	10.0	6.5	12.3	12.8	15.7	15.5	20.5
	125.0	4.6	4.1	10.0	11.2	12.4	13.4	15.6	18.9	23.5	25.8
	160.0	10.7	11.3	15.3	20.3	31.2	23.5	27.8	29.2	30.5	30.7
	200.0	27.6	23.7	27.7	31.6	34.3	36.3	39.0	40.8	43.0	44.5
	250.0	25.3	34.6	34.1	38.4	39.8	43.8	45.2	48.4	49.7	52.9
	315.0	23.0	24.9	27.2	30.1	32.7	40.6	36.5	42.1	41.8	44.9
	400.0	17.0	21.9	27.9	28.3	30.8	35.0	36.2	39.7	40.1	42.6
	500.0	16.7	19.6	23.4	32.3	31.6	34.6	37.2	37.4	41.0	43.5
	630.0	15.5	19.4	24.3	26.9	30.7	34.7	38.4	42.7	44.6	43.8
	800.0	15.8	18.4	23.7	27.8	32.1	36.1	38.2	41.3	47.4	46.4
	1000.0	15.2	18.7	24.0	29.4	33.6	38.1	40.2	43.8	45.6	47.9
	1250.0	15.9	19.4	22.0	25.9	30.2	35.4	37.4	41.2	43.7	44.3
	1600.0	18.9	20.3	21.9	26.1	29.7	33.8	36.6	39.5	43.1	45.2
	2000.0	16.6	17.3	20.0	25.2	29.5	33.8	36.7	40.0	42.4	45.7
	2500.0	15.7	15.5	16.7	20.0	23.4	28.1	31.8	35.9	37.8	40.7
	3150.0	15.5	15.5	16.8	19.5	22.8	27.2	31.1	34.6	37.8	40.4
	4000.0	16.0	15.9	16.2	17.9	19.7	23.0	27.3	30.5	33.8	36.2
	5000.0	16.1	16.3	16.0	17.7	18.7	19.8	23.0	26.9	30.6	32.9
	6300.0	16.2	16.4	16.3	17.3	19.9	18.9	22.2	26.3	29.3	32.6
	8000.0	15.2	15.3	15.4	16.0	15.9	15.8	16.9	18.7	21.1	24.5
	10000.0	12.9	12.8	12.8	14.2	14.0	13.2	13.9	15.7	18.3	21.8
	12500.0	9.4	9.4	9.2	10.9	9.5	9.5	9.6	10.0	10.8	12.2
	16000.0	5.5	5.9	5.8	6.6	5.9	6.3	6.5	6.6	7.0	7.7

Model		PFWSL-05-ECM									
speed		500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM
Sound Power dB(A)		32.7	35.4	38.4	41.3	45.0	48.0	51.7	54.1	55.9	57.9
A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa	20.0	4.3	-0.9	2.2	-0.6	3.4	3.8	1.1	0.7	5.2	5.2
	25.0	18.3	10.8	13.6	12.6	12.2	14.8	6.3	3.4	12.1	11.9
	31.5	7.8	3.2	3.1	0.9	4.8	4.9	2.4	1.2	4.7	3.3
	40.0	7.6	7.1	6.5	6.7	10.4	9.5	3.2	10.7	8.2	9.7
	50.0	13.0	13.3	13.8	9.3	14.3	16.0	16.3	17.3	15.8	16.8
	63.0	5.9	7.8	4.8	6.1	6.0	9.6	12.2	12.0	8.2	9.8
	80.0	10.1	8.8	8.2	12.7	7.9	11.8	11.0	15.9	13.5	13.9
	100.0	9.5	9.5	9.3	10.4	9.9	11.4	15.4	13.3	16.5	16.6
	125.0	9.1	9.8	12.4	12.3	10.2	13.3	14.6	20.5	23.6	24.1
	160.0	9.1	10.6	16.9	20.8	23.6	21.7	26.8	27.8	33.1	32.4
	200.0	26.0	22.4	27.2	30.4	34.9	38.5	41.6	41.7	43.9	46.3
	250.0	27.4	33.6	36.6	37.3	40.6	44.6	47.4	49.3	50.2	54.8
	315.0	19.9	22.1	29.1	31.2	35.3	36.5	38.7	42.3	41.7	45.3
	400.0	13.5	19.7	27.9	28.2	30.3	33.8	37.8	38.3	40.9	41.3
	500.0	15.2	19.3	24.0	28.9	30.4	33.7	36.3	39.9	41.7	42.2
	630.0	13.1	19.0	24.0	28.1	30.0	33.9	39.4	42.5	41.8	43.0
	800.0	13.8	18.5	22.9	28.1	32.1	36.1	39.0	41.1	46.3	45.8
	1000.0	15.7	19.4	24.8	28.6	32.2	35.9	40.4	42.7	44.5	46.4
	1250.0	18.1	20.6	22.5	27.0	30.8	34.4	38.3	40.8	42.5	44.5
	1600.0	17.1	20.0	21.2	25.7	30.0	33.5	37.1	39.7	42.0	43.8
	2000.0	16.1	17.7	20.8	24.7	29.2	33.4	37.3	40.4	43.0	45.0
	2500.0	15.5	15.9	17.5	20.4	24.7	28.8	32.3	36.3	38.8	40.7
	3150.0	16.1	16.0	17.2	19.3	23.3	27.2	31.6	35.6	37.6	39.6
	4000.0	15.8	16.3	17.2	18.2	22.0	24.1	28.5	33.2	35.6	37.1
	5000.0	16.2	16.4	16.4	16.9	18.7	20.3	24.7	28.6	32.0	33.4
	6300.0	16.0	16.3	16.1	16.6	18.0	19.1	23.9	28.3	32.0	32.7
	8000.0	15.2	15.5	15.1	15.6	15.8	16.3	17.7	21.0	24.3	25.5
	10000.0	13.0	13.4	13.6	13.2	13.2	13.4	14.8	18.1	20.9	22.6
	12500.0	9.6	9.7	9.8	9.7	9.6	9.6	10.0	10.9	12.2	13.2
	16000.0		5.7	6.2	6.5	6.9	6.8	6.6	6.7	7.5	8.0

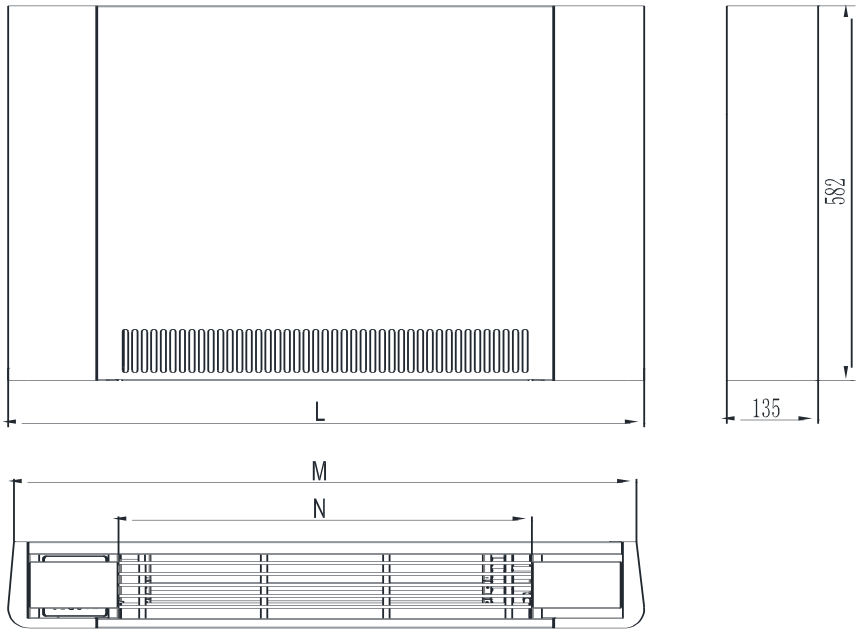
A.5. Dimensions

A5.1 Uncased unit dimensions



MODEL	01	02	03	04	05
L	438	638	838	1038	1238

A.4.2 Cased unit dimensions

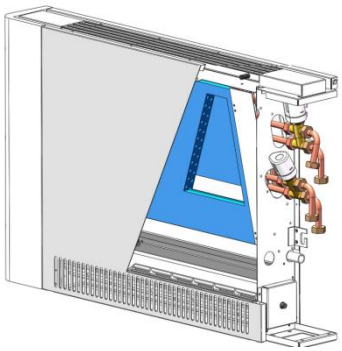


MODEL	01	02	03	04	05
L	735	935	1135	1335	1535
M	716	916	1116	1315	1515
N	408	608	808	1008	1208

A.6. Unit Configuration

Model				01	02	03	04	05
Fan	Type			Cross Fan				
	Quantity			1	1	1	2	2
	Model			Dia.90*394	Dia.90*590	dia.90*785	2-dia.90*450	2-dia.90*550
	Material			ABS				
	Drive			Direct Drive				
Motor	Type			EC Motor				
	Number of motors			1	1	1	1	1
	Power supply			208~240V/1P/50~60Hz or 115V/1P/60Hz				
	IP/Insulation class			IP20/Class B				
Coil	Type			Seamless copper tube mechanically bonded to corrugated aluminum fin				
	Testing pressure			Leakage test 2.5MPa for 3 minutes				
	Tube	Material		copper				
		Diameter	mm	9.52 for 2-pipe; 7 for 4-pipe				
		Thickness	mm	0.3				
	Fin	Material		Organic gold high corrosion resistant hydrophilic aluminum				
		Thickness	mm	0.105				
		Face area	m2	0.0903	0.1503	0.2103	0.2703	0.3303
		Row		3R				
		Fins per inch		17				
Insulation	Drain pan	Material		NBR plastic foam				
		Thickness	mm	5	5	5	5	5
Air filter	Material			Nylon media				
	Number			1	2	2	3	3
	size	Length	mm	400	600	800	500*2	600*2
		Width	mm	150	150	150	150	150
		Thickness	mm	3	3	3	3	3
Drain pan	Material			Positive sloped drain pans are steel with powder finish, coated with self-extinguishing closed cell expanded polyethylene				
	Thickness		mm	1	1	1	1	1

A.7. Valve Kit Information (Optional Part)

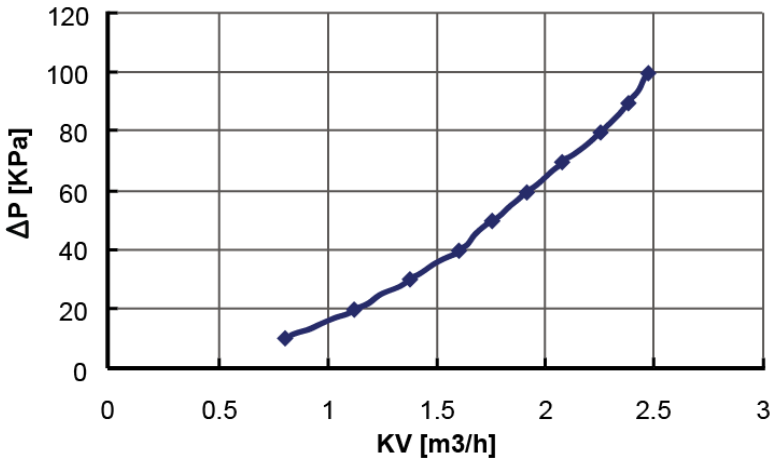
Code	Description	Photo
BCP18-RCS-VALVE-PFWSL-001	115~240VAC 1/2"2-way thermal valve kit	
BCP18-RCS-VALVE-PFWSL-002	115~240VAC 1/2" 3-way thermal valve kit	
BCP18-RCS-VALVE-PFWSL-003	24VAC 1/2" Modulating 2-way thermal valve kit	
BCP18-RCS-VALVE-PFWSL-004	24VAC 1/2" Modulating 3-way thermal valve kit	

Electro thermal valve consist of electro thermal actuator and valve body. They are used to adjust the room temperature by control the Open/close or modulating water flow volume.

A.7.1. **Valv**e Body

Material	Valve body: Forging Brass HPb59-1	Valve stem: Stainless steel (1Cr18Ni9)	
	Inner cover:PBT	Piston:FRPA-66	O-sealing-ring: Nitrile rubber
Stroke	3.5mm ,5.0mm		
Medium	Water, water+ glycol		
Temperature	5~95°		

Differential Pressure Chart



A.7.2. **Actuator Type**

Model	On/off 230V	On/off 24V	Modulating 24V
	Normal closed	Normal closed	Normal closed
Voltage	230Vac	24Vac	24Vac
Working force	90~125N	90~125N	90~125N
Time	4.5min	4.5min	4.5min
Power	3W	3W	3W
Full stroke	3.5mm	3.5mm	5.0mm
Imax	150mA	250mA	250mA
Wires	2-wire	2-wire	4-wire (Brown/Blue, Black/Red)

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
220/230	1	50/60

Water circuit

Minimum entering water temperature	+2 °C
Maximum entering water temperature	+80 °C
Water side maximum pressure	1600 kPa

B.3. Installation and Location

- PRELIMINARY INFORMATION

General
Operate in compliance with safety regulations in force. For detailed information (dimensions, weight, technical characteristics etc.) please refer to the TECHNICAL INFORMATION section.

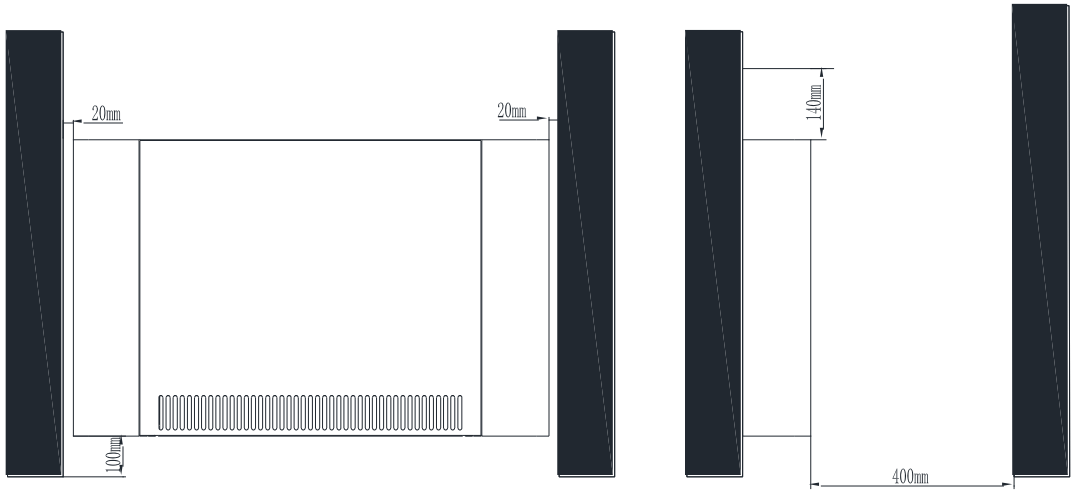
Use single protection devices: gloves, glasses etc.

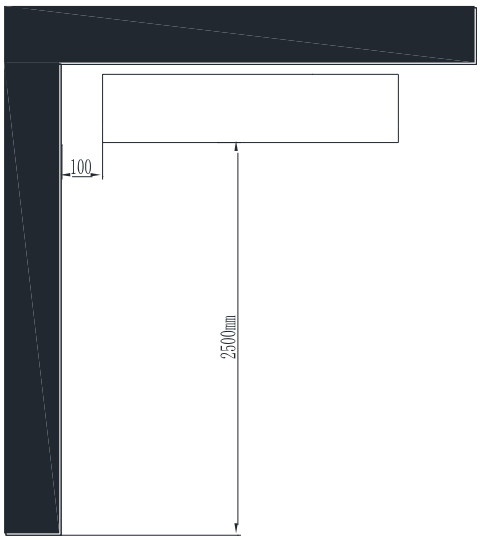
During positioning consider these elements:
- Technical spaces required for the machine and system;
- Place where the machine will be installed ;
- Electrical connections;
- Water connections
- Air / aeraulic ducts

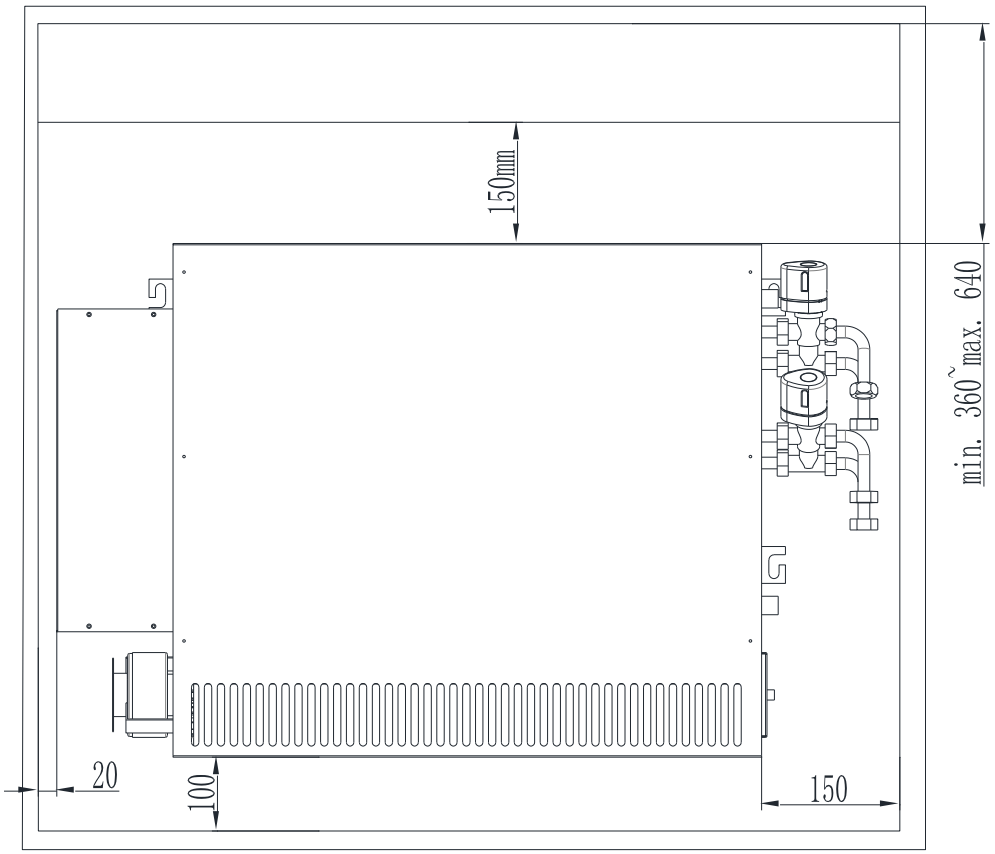
- FUNCTION SPACE

Functional spaces are designed to:
- Guarantee good unit operation;
- Carry out maintenance operations;
- Protect authorized operators and exposed people.

Respect all functional spaces indicated in the figure.


20mm
20mm
100mm
140mm
400mm


100
2500mm

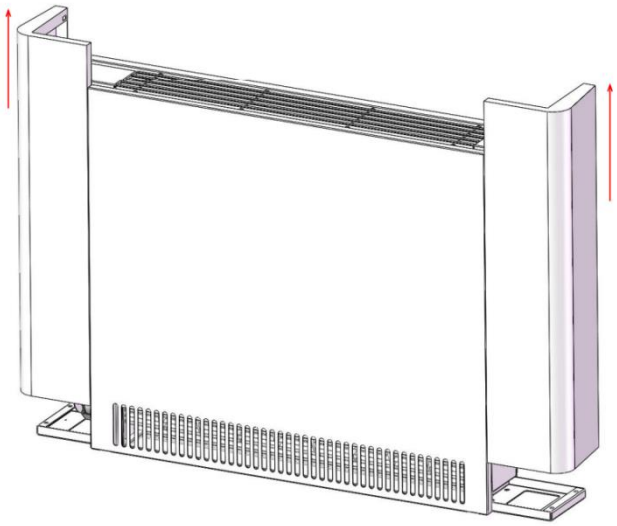

150mm
min. 360~max. 640
20
100
150

➢ INSTALLATION

The following descriptions of the various mounting phase and the relative designs refer to a version of the machine with fixtures on the right. The operations for the mounting of machines with fixtures on the left are exactly the same. Only the images are to be considered as a mirror image.

➢ SIDE OPENING

Before installation the unit, please remove the two sides casing.



➢ HORIZONTAL OR CEILING INSTALLATION

- Using the paper template, trace on the ceiling the position of the two fixing brackets and the two rear screws.
- Using a suitable drill, make the holes and insert the toggle bolts.
- Position the machine on the bolts, keeping it in position and then fix the screws into the rear toggle bolts one on each side.
- Make sure that there is sufficient inclination of the unit towards the drainage pipe to facilitate the water drainage.
- Fully tighten all 4 fixing screw

➢ VERTICAL FLOOR OR WALL INSTALLATION

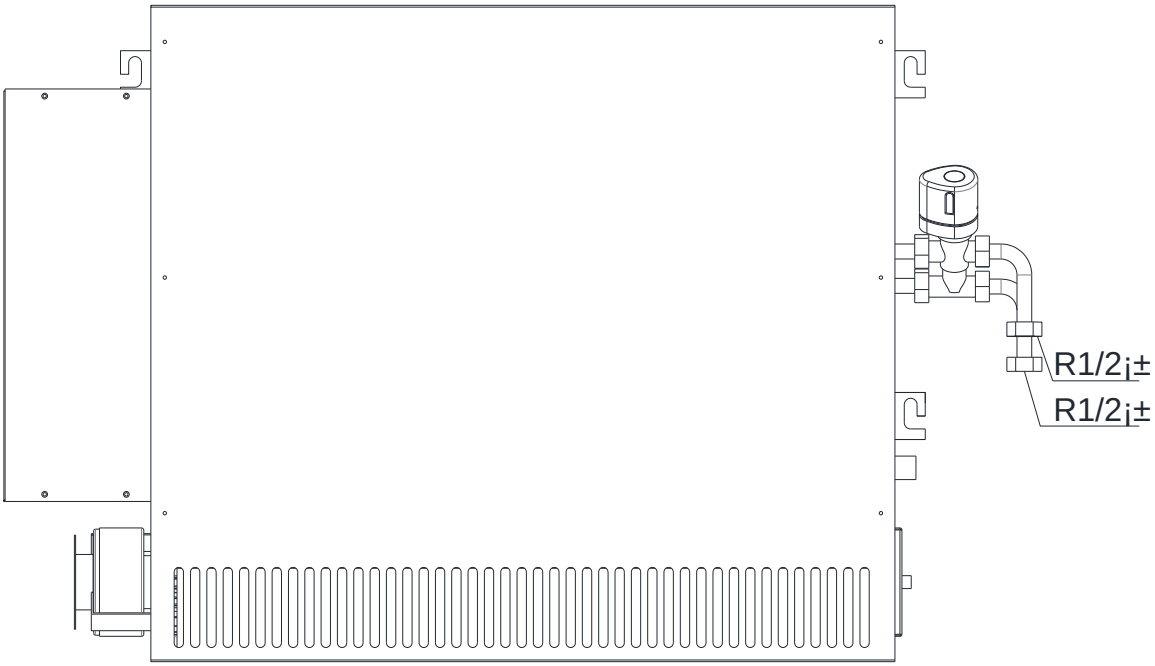
When floor mounting with support pins, respect the min. ground height of 80mm. for the pin mounting and refer to the individual instructions leaflets supplied and the relative manual

- Using the paper template, trace the position of the two fixing brackets on the wall
- Use a suitable drill to make the holes with and insert the toggle bolts
- Fully tighten the four screws to block the two brackets. x Check the stability by manually moving the brackets to the right and to the left, up and down. x Mount the unit, checking that it fits correctly onto the brackets and checking that it is stable (fig. 3.5).

B.4. WATER CONNECTIONS

The fan coils have been designed and made for installation in heating and air-conditioning systems.
The characteristics of the water fittings are given below:

Main pipes connection
In water connection: R1/2";
Out water connection: R1/2"



CONDENSATE DRAINAGE

For use in air-conditioning systems, the fan coils are fitted with a condensate-collecting tray to which a drainpipe can be connected. Connect an insulated drainage pipe (inside ø 16 mm.) to the hole of the tray and direct it towards a suitable drain

Notes:

i. Check that the condensation flows out regularly into the tray.
ii. The drainage pipe should have a 2% slope towards the drain.
iii. Check all the joints for leaks.
iv. Apply heat-insulating material to the joints.

IMPORTANT
Gravity drainage may be converted into forced drainage by attaching the condensate drain pump available as an accessory.

B.5. Electrical Connection

- 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.
- Always take safety precautions before wiring for mains supply. See section B.1. for Safety Precautions.
- One standard power cord (optional), two auxiliary contacts for outdoor unit or Electric Heater, one window contact, one wired wall pad contact and two cooling / heating valve plugs are integrated with PCB.
- Refer to Section D and F for Control PCB configurations and wiring diagrams.

C. Maintenance

C.1. General Maintenance

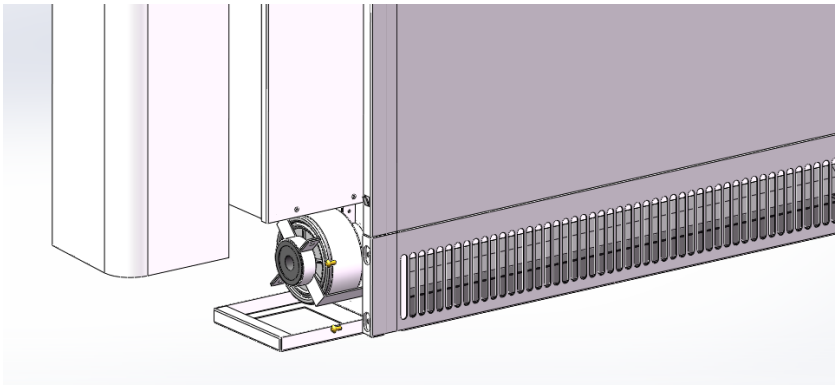
1. Installation and maintenance should be performed by qualified personnel who are familiar with local codes and regulations, and are experienced with this type of appliance.
2. Confirm the unit has been switched OFF before installing or service.
3. Prevent damage and unexpected shutting down of the fan coil unit.
4. Check the cleanliness of the filter and replace or clean as required monthly.
5. Clean the coils with compressed air or water to remove dust, dirt or lint. They can be brushed with a soft brush or vacuumed with a vacuum cleaner.
6. If the water coil is not being used during the winter season, it should be drained or an anti-freezing solution should be added to the water circuit to avoid freezing.

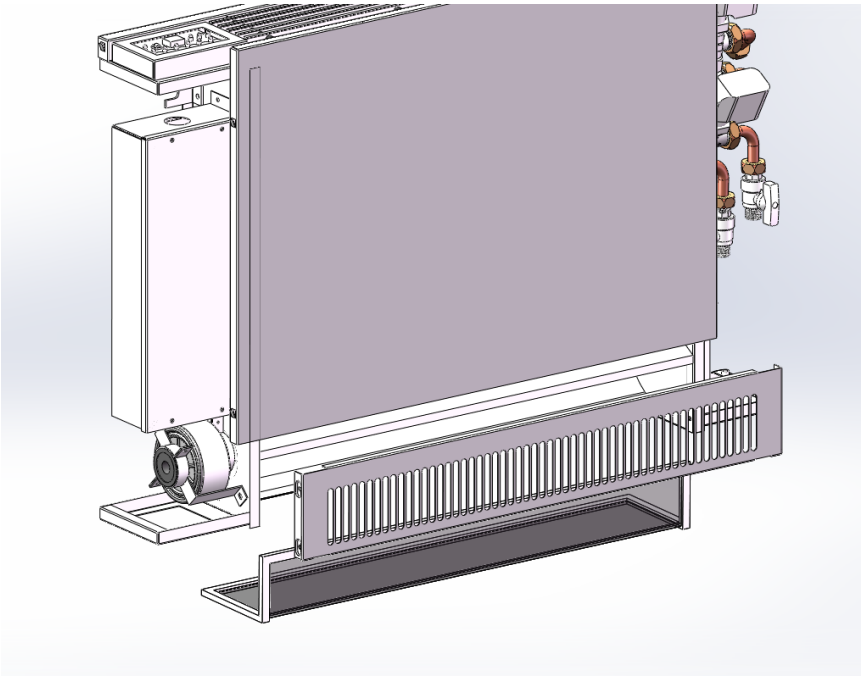
C.2. Regular Maintenance

1. Inspect and clean the condensate drain pan to avoid any clogging of drainage by dirt, dust, etc. Inspect drainage piping to ensure the proper condensate flow.
2. Check and clean the coil. Clean the coils with a low-pressure water jet or low pressure air.
3. Clean and tighten all the wiring connections.
4. Drain out the water in the system and check for buildup of mineral deposits.

C.3. Filter Installation & Cleaning

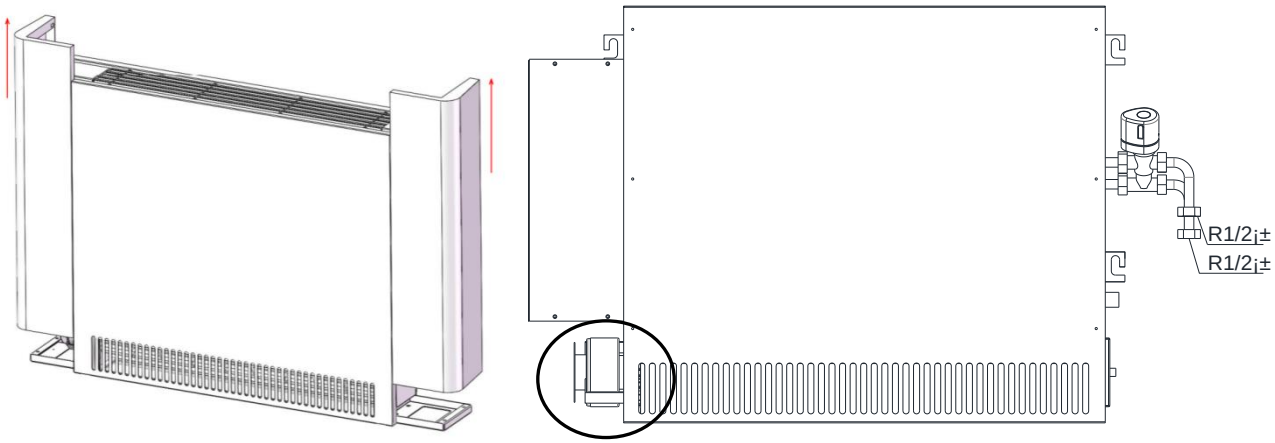
No any tools required. Remove the filter from bottom directly.





C.4. Fan Motor Assembly Maintenance

Step 1: Remove the side case



Step 2: Loosen screws on the mounting brackets. EC motor can be removed.

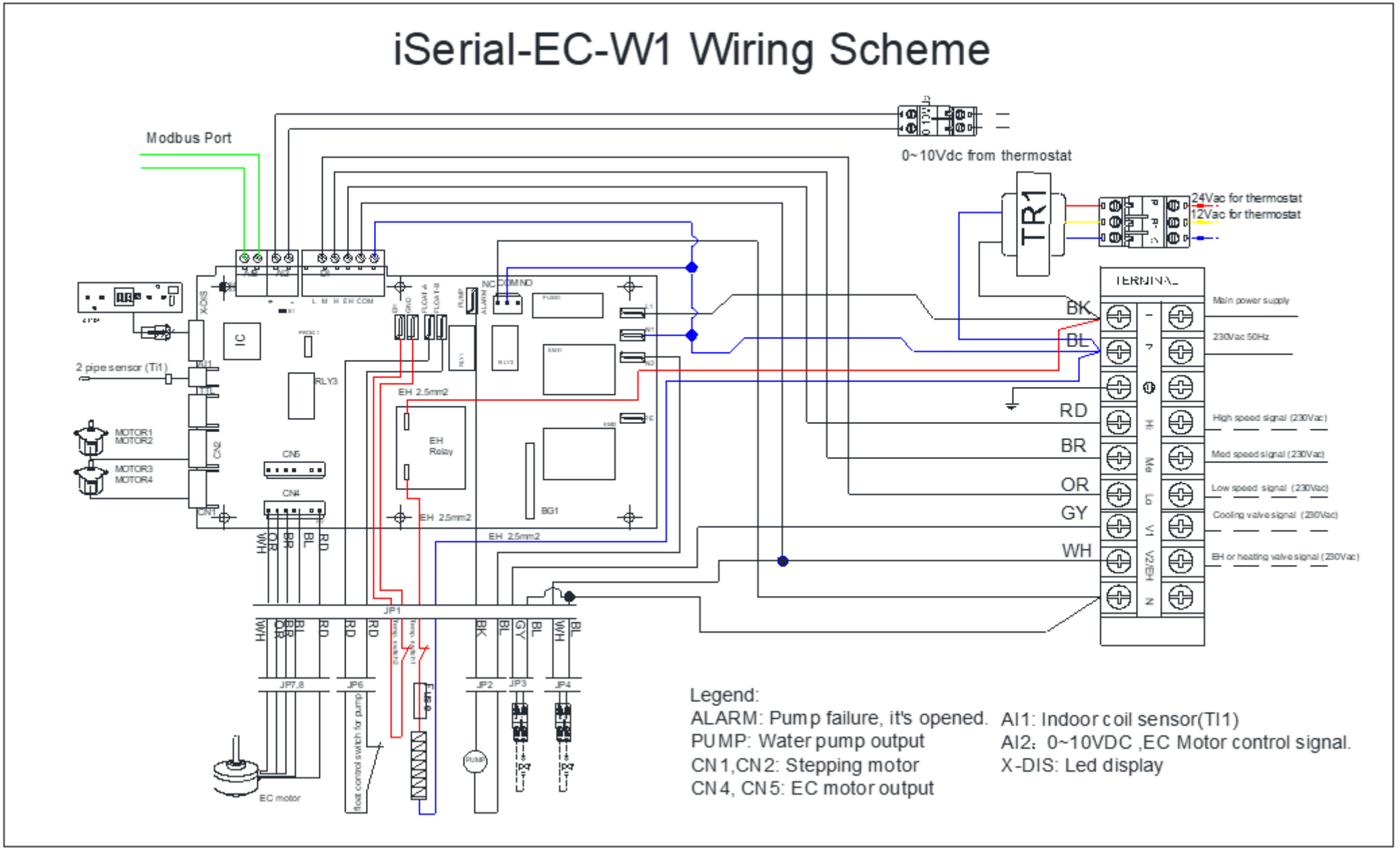
Step 3: Once finished with maintenance, remount the front panel.

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

D.1. I/O Port Definitions

I/O		Code	Descriptions
Analogue input	Coil temperature sensor	AI1	Cooling / heating coil sensor (Ti1)
Voltage input	High fan speed	H	230 VAC input signals from wired thermostat
	Medium fan speed	M	
	Low fan speed	L	
	EH signal	EH	230 VAC input signals from wired thermostat （W1-Used it)
	Phase	L1	External 230VAC power supply connection to the PCB
	Neutral	N1, N2	
	Earth	GND	
Signal Input	Modulating signal	+/-	Low voltage modulating signal input (standard 0~5 VDC, S1=OPEN, optional 0~10 VDC, S1=CLOSED)
Digital input	Float switch	Float	Voltage free (NC)
Voltage output	Water pump	PUMP	Voltage output (L)
	EC motor1	CN3	5-wire connection
	EC motor2	CN4	5-wire connection
	Stepping motor	CN1, CN2	Low-voltage output (W1-used it)
	EH Relay	CN5	When EH signal input is powered on and EC motor RPM>300 RPM, EH output is turned on (W1-Used it)
Digital output	LED display	X-DIS	Low-voltage output
Voltage-free output	Alarm	ALARM	Voltage-free alarm contact: (a) Standard configuration is (NC).
Communication port	Modbus Port	A, B	Modbus Protocol

D.2. Wiring Diagrams



D.3. Control Logic Specifications

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 (MS30006) is above 200RPM.
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 (MS30006) 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 ;

Drain Pump Operation

a) When the unit turns ON:
   i. If Ti1 < 14 ºC, the drain pump turns ON.
   ii. If 14ºC<=Ti<16ºC, the drain pan keeps original state.
   iii. If Ti1 ≥ 16 ºC, the drain pump turns OFF.
b) When the unit turns OFF , the drain pump will remain ON for 5 minutes and then turn OFF.
c) At any time:
   i. If the float switch is OPEN, the drain pump will turn ON.
   ii. If the float switch is OPEN and then CLOSES, the drain pump will remain ON for 5 minutes, and then turn OFF.

Louver Control for W1

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 (100º 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 opened at once.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN WINTER

When MS30012=0, the function is able;
When MS30012=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.
Unitis in Standby Mode
If Ti1≦ 2 ºC for 2 minutes, report error code and Buzzer is beeping.LED Display and Error Description

D.4. 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.

Holding Register table

Description	Address	Type*	Remark
Motor1 minimum RPM (CN4 Port)	30000	R/W	200~1500rpm700
Motor1 maximum RPM (CN4 Port)	30001	R/W	200~1500rpm
Motor2 minimum RPM (CN5 Port)	30002	R/W	200~1500rpm
Motor2 maximum RPM (CN5 Port)	30003	R/W	200~1500rpm1350
Motor qty setting	30004	R/W	0=EC motor1 working 1=EC motor2 working 2=EC motor 1/2 working default: 2
Reserved	30005	R/W	
Motor1 RPM writing	30006	R/W	MS30006=0~200, Motor1 works according to signal input1; MS30006=above 200, Motor1 RPM is according to RPM writing.
Motor2 RPM writing	30007	R/W	MS30007=0~200, Motor2 works according to signal input1; MS30007=above 200, Motor2 RPM is according to RPM writing.
Unit Address setting	30008	R/W	1~15; Default: 55
High speed RPM setting	30009	R/W	200~1500rpm 1300rpm
M- speed RPM setting	30010	R/W	200~1500rpm 1100rpm
L-speed RPM setting	30011	R/W	200~1500rpm 900rpm
Anti-frozen protection setting	30012		0=able; 1=disable. Default:0
Optimized swing angle	30013	R/W	200~999 default：0；

Input Register table:

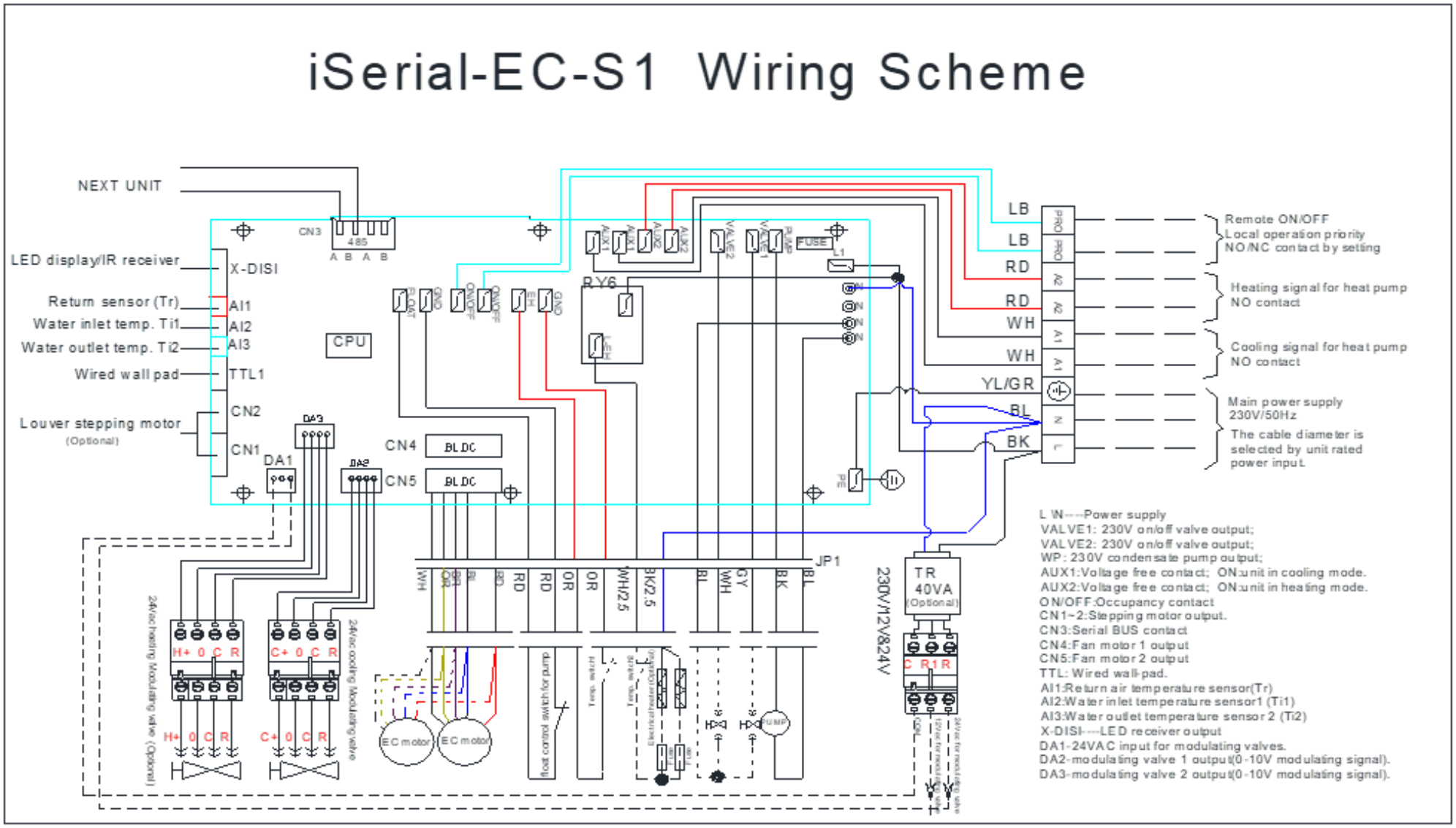
Description	Address	Type*	Remark
EC motor1 actual RPM	40000	R	
EC motor2 actual RPM	40001	R	
EC motor1 error	40002	R	
EC motor2 error	40003	R	
Input signal1 (0~10Vdc)	40004	R	
Reserved	40005	R	
Condensate pump	40006	R	
Electrical heater	40007	R	
Ti1	40008	R	
Wired wall pad	40009	R	
Hi-speed input	40010	R	
M-speed input	40011	R	
L-speed input	40012	R	
Float switch input	40013	R	
EH safety switch input	40014	R	
Alarm output	40015	R	
ERR Code	40016	R	
Software Version	40017	R	3202201202

E. Control Specifications: Intelligent Control (I Type)

E.1. I/O Port Definitions

I/O		Code	Description
Analogue Input	Return air sensor	AI1	Return air temperature (Tr)
	2-pipe coil circuit sensor	AI2	Water inlet temperature sensor (Ti1)
	Hot water Sensor	AI3	Water outlet temperature sensor (Ti2)
Input	LED display / 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);
	Electric Heater safety switch	EH	Voltage-free (NC). The contact is connected with E-heater safeties.
Power input	Phase	L1	Power supply to the PCB;
	Neutral	N1	Power supply to the PCB;
	Earth	PE1	Power supply to the PCB;
Voltage output	Fan 1	CN4	Fan 1 driver
	Fan2	CN5	Fan 2 driver
	Valve1	MTV1	On/off valve
	Valve2	MTV2	On/off valve
	Water pump	WP	Voltage output (L), Power supply to condensate pump.
	Voltage of Electric Heater (Live)	L-EH	Voltage output (L), maximum 30A.
	Stepping motor	CN1-2	Power supply to louver stepping motors.
output	Cooling signal contact.	AUX1	Voltage free contact. Maximum load 5A.
	Heating signal contact.	AUX2	Voltage free contact. Maximum load 5A.
	24VAC power input	DA1	24VAC external power supply (modulating valve applications only).
	Modulating valve control	DA2	0~10Vdc
	Modulating valve control	DA3	0~10Vdc
	In Modbus signal	AB	Modbus port
	Out Modbus signal	AB	

E.2. Wiring diagram



E.3. **Control Logics for 2-pipe System**

E.3.1. With Modulating Valve Configuration

COOL MODE

1. 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<=15^{o} C, 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<=28^{o} C (Modbus 300017 setting), DA2 output is kept at 10Vdc;

When Ti1>28^{o} C(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;

2. When unit is turned off, MTV1 and AUX1 are off. DA2 is 0Vdc. Fan is turned off delaying 30s.

3. The range of Ts is 16 - 30ºC

4. Indoor fan speed can be adjusted to low, medium, high and auto.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If Ti1 ≦ 2 ^{O}C for 2 minutes

1. MTV1 is turned OFF,
2. DA2 is set to 0%,
3. Indoor fan is turned on to Medium speed if fan runs at low speed.

If Ti1 ≧ 5^{O}C for 2 minutes

1. MTV1 is turned ON,
2. DA2 is set to original status,
3. 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）

1. 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 300028 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 00VDc; Fan is turned off delaying 2 minutes.

With Electrical Heater as booster（Modbus300043=1）

2. 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 300028 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.

3. When unit is turned off, MTV1 and AUX2 is turned off; DA2 is at 00VDc; Fan is turned off delaying 2 minutes.

With Electrical Heater as booster（Modbus300043=2）

1. 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.

2. When unit is turned off, EH is turned off; Fan is turned off delaying 2 minutes.

OVER-HEAT PROTECTION OF INDOOR COIL

a) If Ti1 ≥ 75ºC, then MTV1 ,AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
b) If Ti1 < 70ºC, then unit keep original state;
c) 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:

a) AUX1 is turned on; Ts is 24 ºC;
b) 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;
c) 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;
d) 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;
e) 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 °C, the unit is worked in heating mode;

If Tr-3 °C<Ts<Tr+3 °C， the unit is worked in fan mode;

If Ts<Tr-3 °C， the unit is worked 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 MS10004=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 MS10004=1;

1) The unit is on or standby, PRO input is open or closed, the unit is kept original state;

2) The unit is off,

PRO input is closed for 30S, MTV1 is turned on, DA2 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, DA2 is 0Vdv, Fan is turn off.

3) 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.

E.3.2. **2-pipe Control Logic**-With 6-way modulating Valve Configuration

COOL MODE

1. 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 0VDC 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 4~0VDc;

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 4~0VDc;

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 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- 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 5Vdc;

2. When unit is turned off, MTV1 and AUX1 are off. DA2 is 5Vdc. Fan is turned off delaying 30s.

3. The range of Ts is 16 - 30^{O}C

4. Indoor fan speed can be adjusted to low, medium, high and auto.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If Ti1 ≦ 2 ^{O}C for 2 minutes

1. MTV1 is turned OFF,
2. DA2 is set to 5Vdv,
3. Indoor fan is turned on to Medium speed if fan runs at low speed.

If Ti1 ≧ 5^{O}C for 2 minutes

1. MTV1 is turned ON,
2. DA2 is set to original status,
3. 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）

1. 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 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 300028 setting PID calculation. The output is 6~10VDC;
If Ti1 sensor is damaged, fan is worked at setting speed.

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

2. 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）

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 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 300028 setting PID calculation. The output is 6~10VDC;

If Ti1 sensor is damaged, fan is worked at setting speed.

When Tr > Ts+1ºC ,MTV2 and AUX2 is turned off; EH is turned off; DA2 is at 5VDc; fan is turned on at low speed.

2. When unit is turned off, MTV2 and AUX2 is turned off; DA2 is at 5VDc; Fan is turned off delaying 2 minutes.

OVER-HEAT PROTECTION OF INDOOR COIL

d) If Ti1 ≥ 75ºC, then MTV1 ,AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
e) If Ti1 < 70ºC, then unit keep original state;
f) 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:

a) AUX1 is turned on; Ts is 24 ºC;
b) If Tr ≥ 25ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA2 is 2vdc; Fan is turned on at low speed;
c) If 16ºC ≤ Tr < 25ºC for 30S, 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;
d) If Tr < 16ºC for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA2 is 3.5VDC.
e) 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 is worked in heating mode;

If Tr-3 ºC<Ts<Tr+3 ºC， the unit is worked in fan mode；

If Ts<Tr-3 ºC， the unit is worked in cooling mode；

If unit works in heating or fan mode, when Tr-Ts>3.0ºC, 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>3.0ºC, 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 60S, the unit is turned off.

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

E.4. **4-pipe Control Logic**-With modulating Valve Configuration

COOL MODE

1. 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;

2. When unit is turned off, MTV1 and AUX1 are off. DA2 is 0Vdc. Fan is turned off delaying 30s.
3. The range of Ts is 16 - 30ºC
4. Indoor fan speed can be adjusted to low, medium, high and auto.

LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If Ti1 ≦ 2 ^{O}C for 2 minutes
1. MTV1 is turned OFF,
2. DA2 is set to 0%,
3. Indoor fan is turned on to Medium speed if fan runs at low speed.

If Ti1 ≧ 5^{O}C for 2 minutes
1. MTV1 is turned ON,
2. DA2 is set to original status,
3. 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）

1. 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.

2. When Tr > Ts+1 ºC(Modbus 300033 setting) ºC ,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 delaying 2 minutes.

With Electrical Heater as booster（Modbus300043=1）

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.

2. When unit is turned off, MTV2 and AUX2 is turned off; DA3 is at 0VDc; Fan is turned off delaying 2 minutes.

OVER-HEAT PROTECTION OF INDOOR COIL

g) If Ti2 ≥ 75ºC, then MTV2,AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
h) If Ti2< 70ºC, then unit keep original state;
i) 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:

a) AUX1 is turned on; Ts is 24 ºC;

b) 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;

c) 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;

d) 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;

e) 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 °C, the unit is worked in heating mode;

If Tr-3 °C<Ts<Tr+3 °C，the unit is worked in fan mode；

If Ts<Tr-3 °C， the unit is worked in cooling mode；

If unit works in heating or fan mode, when Tr-Ts>3.0ºC, 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>3.0ºC, 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.

E.5. Sleep Mode

a) SLEEP mode can only be set when the unit is in COOL or HEAT mode.

b) 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 .

c) 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;

d) Sleep mode is turned off, Setting temperature go back and Fan is change to setting speed.

E.6. Auto speed

The fan speed is calculated by PID of room temperature and setting temperature. The fan is running at low speed when the unit is setting at Fan mode.

E.7. Buzzer

The unit will beep once when it receives 1 signal;

E.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.

E.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 24ºC with auto fan speed. There are no timer and SLEEP modes.
- In HEAT mode, the set temperature of the system is 24ºC with auto fan speed. There are no timer and SLEEP modes.
- Master unit that does not use a 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.

E.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.

E.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 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. 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.

E.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 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.

E.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 ºC for 2 minutes

1. MTV1 is turned ON,
2. AUX2 is closed,
3. DA2 is 5VDC;
4. If Ti1 <5 ºC for 2 minutes EH (if present) is switched on
5. Indoor fan is turned on at low speed.

If Tr ≧ 5ºC for 2 minutes

1. MTV2 is OFF,
2. AUX2 is open,
3. DA2 is set to 0VDC.,
4. Electric Heater is turned Off
5. Indoor fan Switched OFF.

If 4-pipe unit is in Standby Mode

If Tr ≦ 2 ºC for 2 minutes

1. MTV2is turned ON,
2. AUX2 is closed,
3. DA3is 5VDC; if unit with 6-way valve, DA2 is 8VDC;
4. If Ti1 <5 ºC for 2 minutes EH (if present) is switched on
5. Indoor fan is turned on at low speed.

If Tr ≧ 5ºC for 2 minutes

1. MTV2 is OFF,
2. AUX2 is open,
3. DA3 is set to 0; if unit with 6-way valve, DA2 is 5VDC;
4. Electric Heater is turned Off
5. Indoor fan Switched OFF.

E.14. Networking System

1) Disconnect the communication plug from the control box

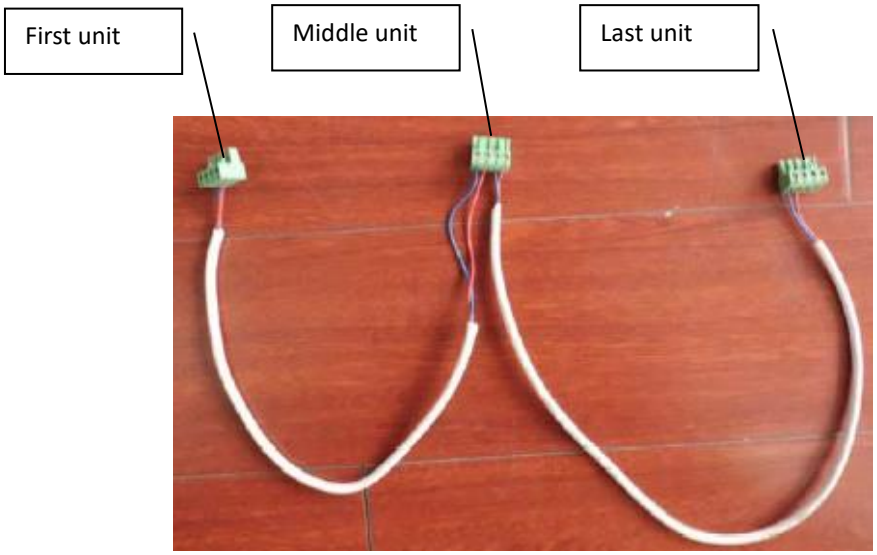
2) Communication plug

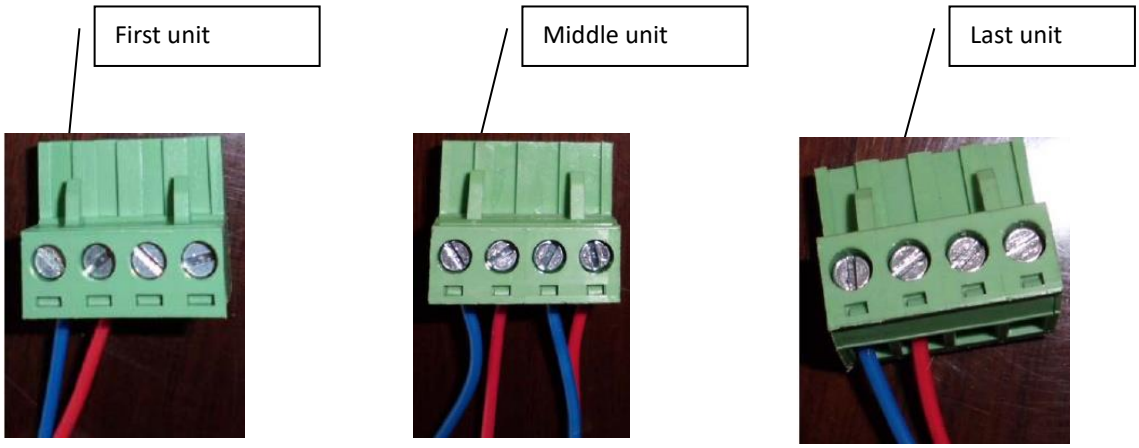
A, B, A, B is printed on the main PCB. When you connect the wires, please ensure connection of A to A and B to B.

3) Connection wire

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

b. Complete wire connection

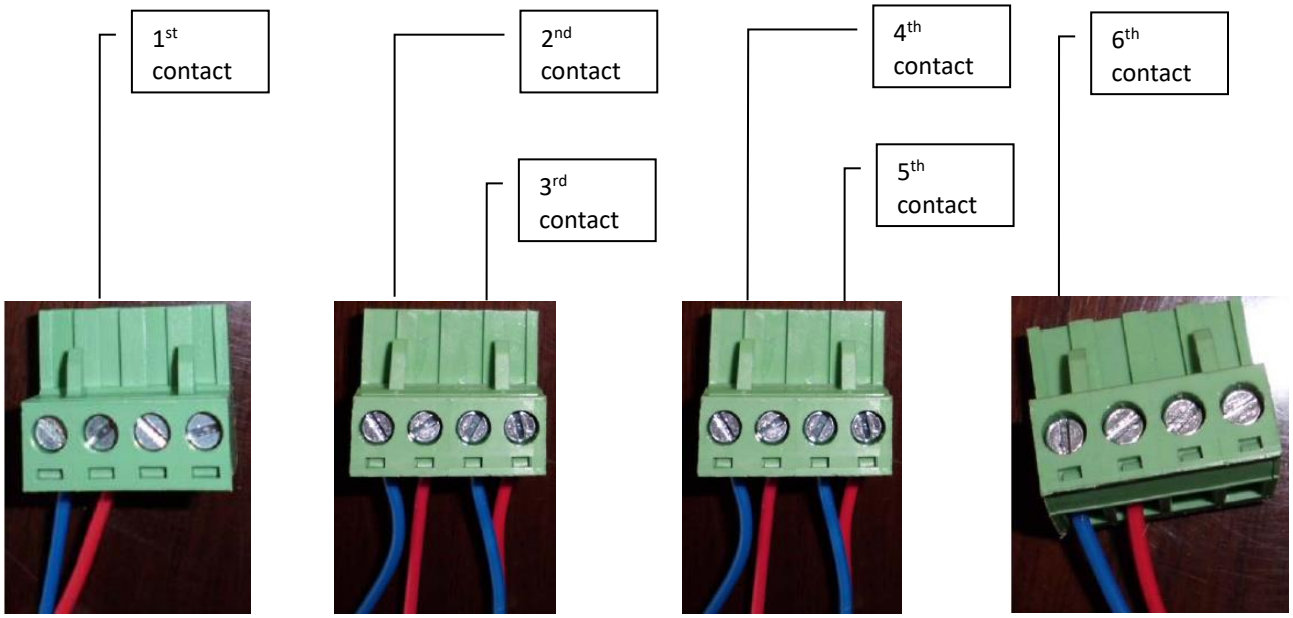




c. Wire connection check

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

E.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 decription
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	decription	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	Datas 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, 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	
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.

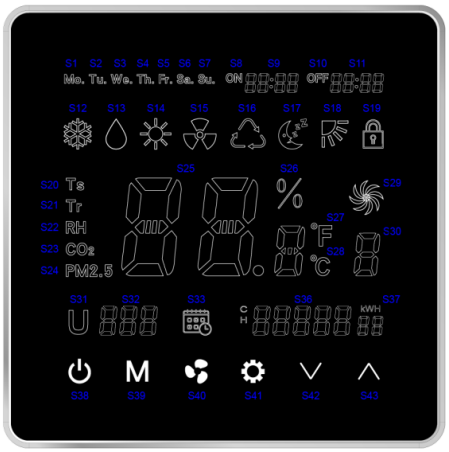
Input Register table:

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	

F. User Interface

F.1. Wired Wall Pad Controller Operation Guide

F.1.1. LED display



Code	Legend	Code	Legend	Code	Legend
S1	Monday	S14	Heating Mode	S27	Fahrenheit degree
S2	Tuesday	S15	Ventilation Mode	S28	Celsius degree
S3	Wednesday	S16	Auto Mode	S29	Fan
S4	Thursday	S17	Sleep mode	S30	0-Auto; 1-Low； 2-Medium; 3-High
S5	Friday	S18	Swing mode	S31	Unit address
S6	Saturday	S19	LED lock	S32	Unit No. / Error code
S7	Sunday	S20	Setting Temperature	S33	Weekly timer
S8	Timer-ON	S21	Room Temperature	S34	C-cooling
S9	Timer-ON time Normally： Real time	S22	RH (if need)	S35	H-heating
S10	Timer-OFF	S23	CO2 density (if need)	S36	Energy consumption
S11	Timer-OFF time	S24	PM2.5 density (if need)	S37	Energy consumption cycle
S12	Cooling Mode	S25	Data Display		
S13	Dehumidification	S26	RH percentage		
S38	On/Off Button	S40	Fan speed setting	S42	Up
S39	Mode setting	S41	Parameter setting	S43	Down

F.1.2. Operation guide

S38	On/OFF Button	Press  to turn on; press it again to turn off.
S39	Mode button	With wall pad on, press  to select Cooling, Dehumidification, Heating, Ventilation or Auto sequentially.
S40	Fan Speed Button	Press  ， S30 is recycled from 0 to3；0_Auto speed, 1_Low speed; 2_Medium speed; 3__High speed.
S41	Parameter Setting Button	Press  for 5S to set weekly date. Press or to set weekly date from Monday to Sunday
		Press  once to set real time. Press  or to increase or decrease real time.
		Press  twice to set Timer ON. Press  to set weekly date from Monday to Sunday. Press  or to increase or decrease Timer ON time. Press  to turn timer ON on or off and S8 appears or disappear,
		Press  3 times to set Timer OFF. Press  to set weekly date from Monday to Sunday. Press  or to increase or decrease Timer OFF time. Press  to turn timer OFF on or off and S appears or disappear,
		Press  4 times to set group control and U31 appears. The function is reserved;
		Press  5 times to set Unit address and U32 appear. Press  or to increase unit address.
		Press  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 parameters setting. S31/S32 is display “U001”,which is used to set unit type 0=AC thermostat 1=EC thermostat 2=AC+EC thermostat S31/S32 is display “U002”,which is used to set user temperature degree 0=Celsius degree 1=Fahrenheit degree S31/S32 is display “U003”,which is used to select display temperature on LCD. 1=Setting temperature 0=Room temperature S31/S32 is display “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 is display “U005”,which is used to set setting temperature band. 1~9°C

S31/S32 is display “U006” - "U0009", 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.

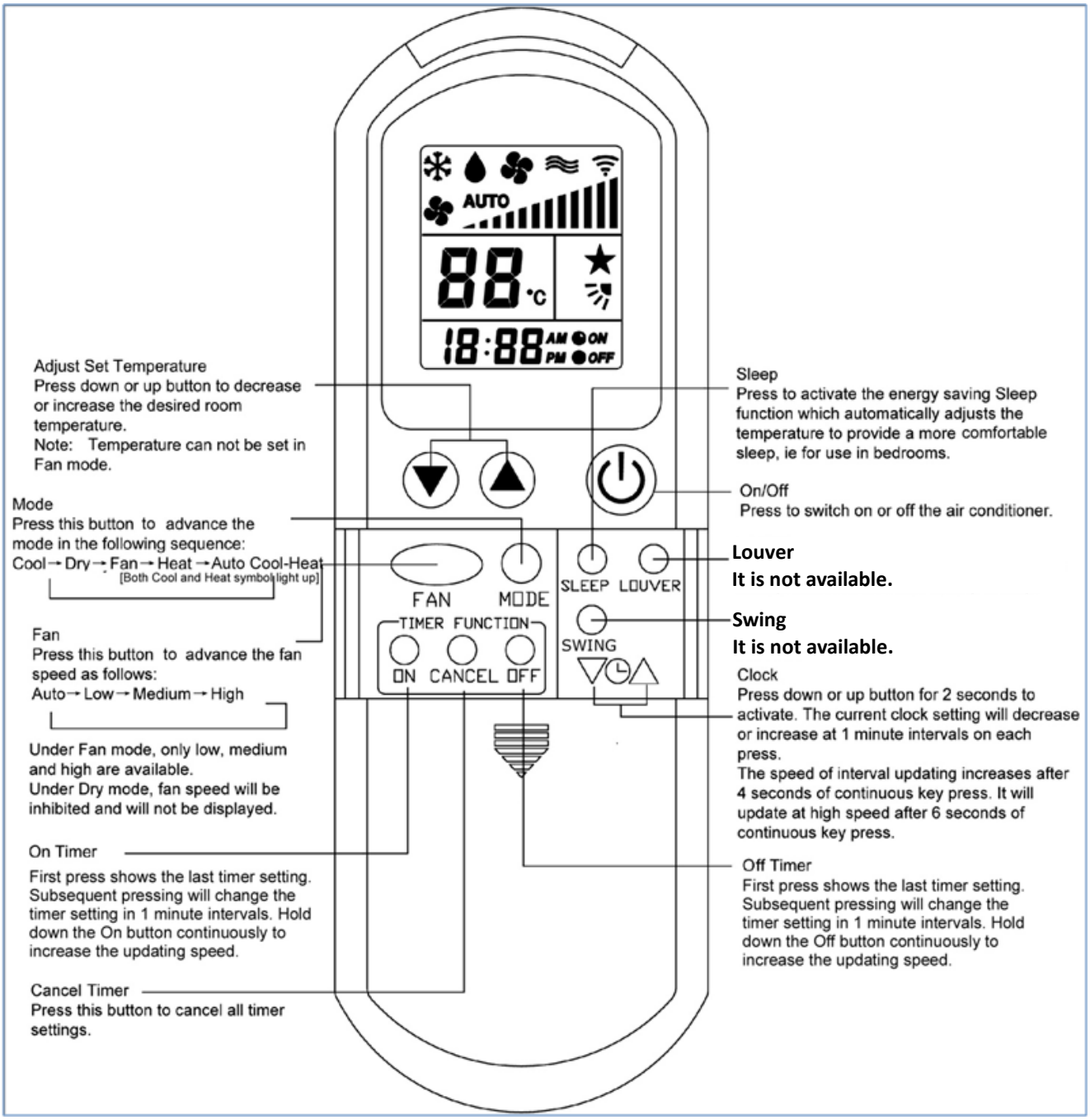
S31/S32 displays “U028”, which is used to set Delta T OF Ti3/Ti4.

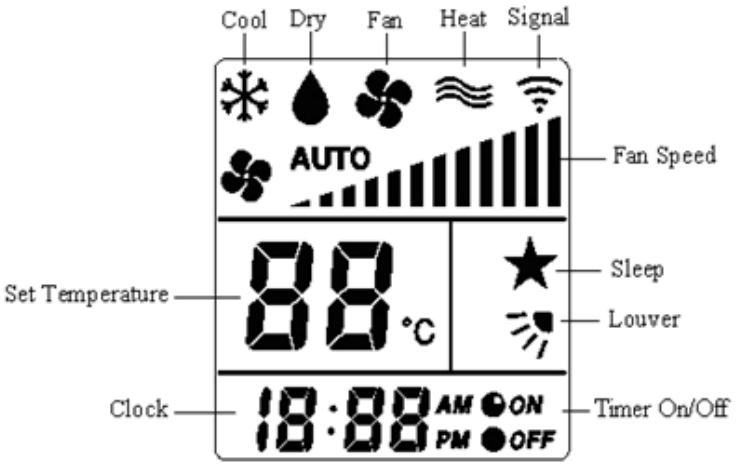
		S31/S32 displays “U029”, which is used to read unit type. S31/S32 displays “U030”, which is used to read unit model. S31/S32 displays “U031”, which is used to read unit manufacturing date.
S32	Error code	S32：E** blinks Bit0 = Room temperature sensor error Bit1 = Ti1 temperature sensor error Bit2 = Ti2 temperature sensor error Bit3 = Float switch error Bit4 = Indoor coil low temperature protection Bit5 = Indoor coil 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
Combination Button Function		Screen Lock Function Press ^ for 5S, S19 appears and screen is locked. Repress ^ for 5S, S19 disappears and screen can be set.
		Swings Function Press v for 5S, S18 appears and swings is ON; Repress v for 5S, S18 disappears and swings is OFF;
		Sleep Mode Press for 5S, S17 appears and sleep mode is ON; Repress for 5S, S17 disappears and sleep mode is OFF;

C.2.2.3 Error Code List

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 over heat 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.
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<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

F.2. **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"& "Louver" functions are not applicable. European version only uses degree C setting.

F.2.1. **Wall Pad, which is installed on the unit**

C.2.3.1 LED display

Code	Legend
On/OFF Light	Unit is On, the light is ON; Unit is OFF, the light is OFF;
Mode Light	When mode is set, the corresponding light is On; In auto mode, 3 LEDs are ON;
Fan speed Light	When fan speed is set, the corresponding light is on;
Sleep mode light	Sleep mode is set, the light is ON;
Temperature Display	Setting Temperature is shown, when up or down button is pressed. After 10s, room temperature is shown;
	When unit is with error, ON/OFF light is blinking and error code is shown; Error 01 means room temperature sensor is damaged; Error 02 means inlet (chilled) water temperature sensor is damaged; Error 03 means outlet (hot) water temperature sensor is damaged; Error 04 means float switch is open if it is connected; Error 05 means inlet chilled water temperature is less than 3° C; Error 06 means hot water temperature is more than 70° C; Error 07 Reserved; Error 08 means EH overheat safety protection if EH connected; Error 09 means EC motor error if CN4 is connected; Error 10 means EC motor error if CN5 is connected; Error 17 means the controller panel connecting with main PCB is not well;

C.2.3.2 Operation guide

Code	Legend
On/OFF Button,	Press to turn on; press it again to turn off
Mode Button	With wall pad on, press to select Cooling, Dry, Heat, Fan or Auto sequentially.
Fan Speed Button	Press , to select Low speed, Medium speed, High speed or Auto speed;
Sleep mode Button	Press to set sleep mode; press it again to cancel sleep mode;
and	Press up or down button to set temperature;

G. Sensor Resistance R-T Conversion Table

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

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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

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H. Troubleshooting

Symptoms	Cause	Remedy
The fan coil does not start up	No voltage	1. Check for presence of voltage 2. Check fuse on board
	Mains switch in the “OFF position	3. Place in the “ON” position
	Faulty room control	4. Check the room control
	Faulty fan	- Check fan motor
Insufficient output	Filter clogged	- Clean the filter
	Air flow obstructed	i. 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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