AHRI

ECO UNIVERSAL SERIES
INSTALLATION, OPERATION & SERVICE MANUAL

PFWB(C)- V / P- EC MOTOR

V - 2pipe / P - 4pipe (Optional 1 row coil)

MDL SOLUTIONS

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.

Management Service

ETL SAFETY STANDARDS

All products conform to UL standard for Safety for Heating and Cooling Equipment UL1995 4th Edition, October 14, 2011;

All products conform to CSA standard for Safety for Heating and Cooling Equipment CSA C22.2 No.236-11, 4th Edition, October 14 2011.

Intertek

WEEE MARK

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

World Leading Design and Technology

Equipped with the latest air-conditioning test rooms and manufacturing technology, our factories in China produce over 2,000,000 air conditioning 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 full CE certification and ISO 9001, several products ranges have UL / ETL safety approval in the USA and Canada, ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting air conditioning equipment.

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

Table of Content

Model Code Nomenclature

PFWB - 06 - VX - S - AECM

AECM	EC Motor Configuration

S	Complete function onboard PCB with integrated group control functionality.
W	Flexible function onboard PCB with drain-pump, louver and zone control functionality.

P	Chilled/Hot Water, 4-Pipe
V	Chilled/Hot Water, 2-Pipe
X	220V/1Ph/60Hz
Y	115V/1Ph/60Hz

06 - 40	Unit Sizes. See General Specification section A for cooling and heating capacities

PFWB	Universal Uncased Unit

PFWBC - 06 - VX S - VAR - AECM
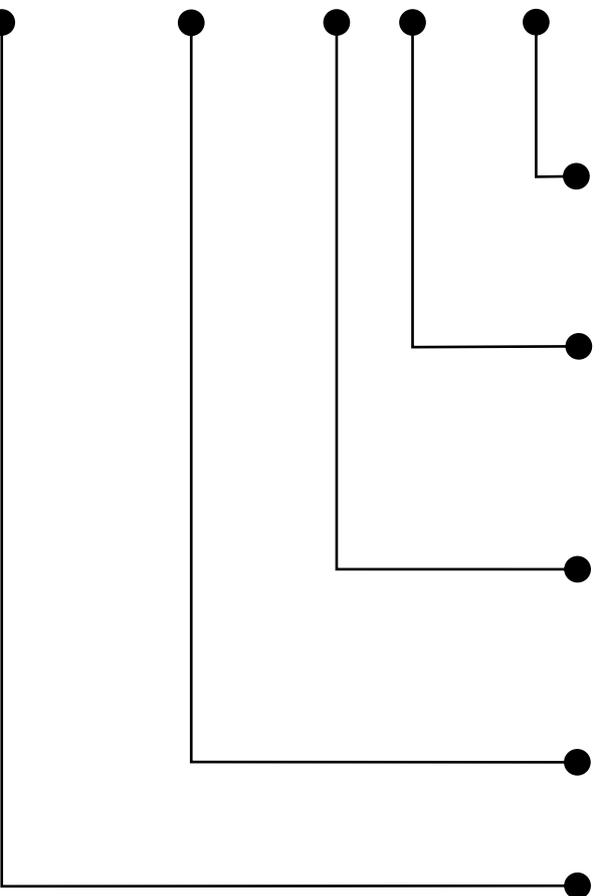
AECM	EC Motor Configuration

VAR	Vertical air return
HAR	Horizontal air return

S	Complete function onboard PCB with integrated group control functionality.
W	Flexible function onboard PCB with drain-pump, louver and zone control functionality.

P	Chilled/Hot Water, 4-Pipe
V	Chilled/Hot Water, 2-Pipe
X	220V/1Ph/60Hz
Y	115V/1Ph/60Hz

06 - 40	Unit Sizes. See General Specification section A for cooling and heating capacities

PFWBC	Universal Cabinet Unit

A. Technical Data
A.1.   Standard feature

The Universal Fan Coil is designed to meet and exceed the demanding requirements for efficiency and quiet operation.

STRUCTURE
The bearing structure is made of galvanized sheet-steel with holes for attaching the structure to the wall/ceiling. The "V" type drain pan is used in the unit which ensure the unit can be installed vertically and horizontally. Fire resistant insulation is fitted internally to provide both thermal and acoustic insulation.

CABINET
The cabinet 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 ABS which the color is RAL9010. There are two small side doors on the both sides which is access to thermostat easily.

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 valves, and hand water drain valves. Coils are tested at the pressure of 360 PSI and recommended for operating at 120 PSI.

FAN
The forward-curved centrifugal fan is statically and dynamically balanced for quiet operation. Fan impellers are made from metal.

EC motor
The unit is using EC motor include driven controls PCB, a constant torque, permanent magnet, brushless EC motor with preliminary 3-speed setting that allow for precise air balancing.

AIR FILTER
The air filter is made of ABS with Nylon filter for PFWBC-HAR. It is easy to removing and cleaning.
The air filter is made of a metal frame which holds the filtering materials. They can be cleaned by rinsing with water or by gently vacuuming it.

Microprocessor controls (S3 type)— The PCB (printed circuit board) microprocessor control board relays control the operation of the indoor-fan motor, water valves (ON/OFF or modulating) and electric heater (if fitted), to maintain room conditions at a user-defined set point. Temperature settings, fan speeds and other control functions can be changed by the infrared handset or wired wall pad.

Electro-mechanical controls (W3 type)— A 24VAC signal from the thermostat which working power is from C and R or from indoor room to terminal G(G/G0/G1) supplies power to the blower motor. When G(G/G0/G1) is powered ON, the vane motor is working and open the vane at maximum position. When G(G/G0/G1) is powered OFF, the vane motor will close the vane. The condensate pump will run continuously, as long as coil temperature is less than 59°F. Alarm interlock relay for unit failure notification in limited PCB. Normally open or normally closed contacts are available for field connection.

A.2.   **Unit Appearance**
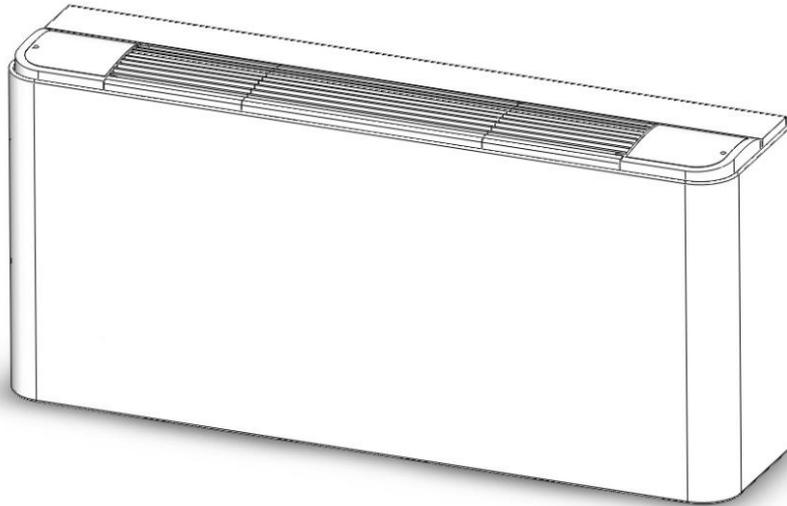
PFWBC-VAR
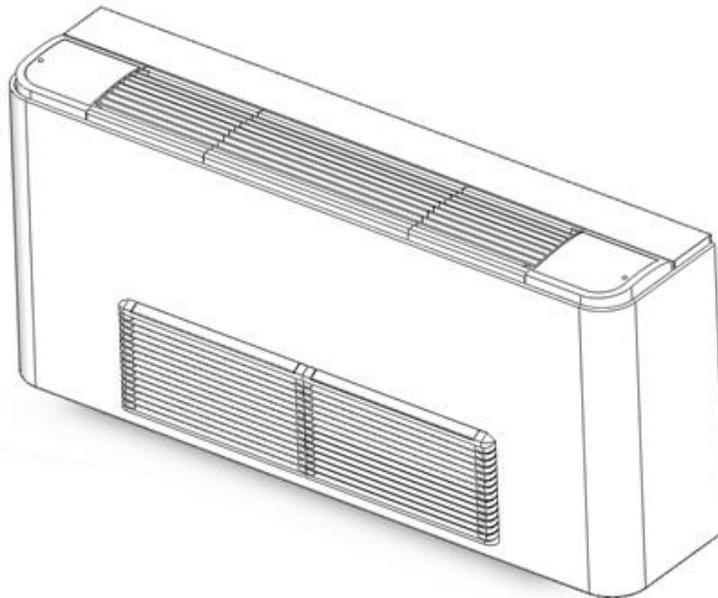
PFWBC-HAR
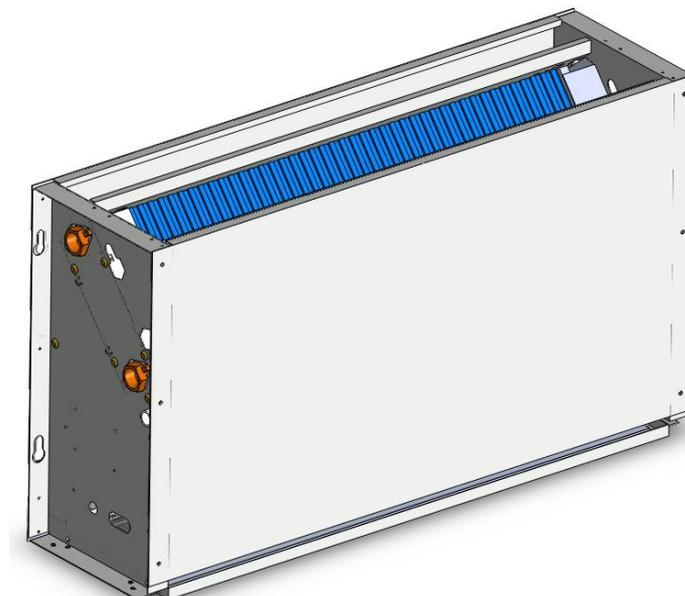
PFWB

A.3. General Specification

A.3.1. 2-Pipe Systems

Product range: PFWB/PFWBC-AECM Universal Uncased/Cabinet Fan Coil with EC Motor

PFWB(3R)-V~-AECM Universal Uncased Unit 3-row coil 2-pipe with EC Motor
PFWBC(3R)-V~-AECM Universal Cabinet Unit 3-row coil 2-pipe with EC Motor

					PFWB(C)(3R)-[Size]-V~-AECM	6	9	12	15	18	24	30	36	40
Unit Configuration			Configuration			2-pipe								
			Number Of Fan Blowers			Single	Twin				Four			
			Operation Control			~S: Complete function onboard PCB with integrated group control functionality.								
						~W: Flexible function onboard PCB with drain-pump, louver and zone control functionality.								
Performance Data	**Air**	Air Flow	H	3	CFM	196	296	386	466	609	794	926	1138	1207
			M	2		165	254	318	384	514	688	847	1006	1112
			L	1		116	201	265	331	424	582	720	794	995
	Cooling	Cooling Capacity	H	3	BTU/Hr	5673	8107	10325	12882	16148	20119	23734	28940	31367
			M	2		4955	7201	8919	11089	14160	18074	22205	26365	29501
			L	1		3791	6038	7742	9915	12219	15940	19622	22008	27111
		Sensible Cooling Capacity	H	3		3898	5582	7173	8855	11115	14154	16580	20135	21692
			M	2		3392	4942	6170	7592	9714	12668	15480	18294	20368
			L	1		2576	4124	5332	6768	8350	11125	13626	15190	18674
	Heating	Heating Capacity	H	3	BTU/Hr	9077	12971	16520	20611	25837	32190	37974	46304	50187
			M	2		7928	11522	14270	17742	22656	28918	35528	42184	47202
			L	1		6066	9661	12387	15864	19550	25504	31395	35213	43378
		Max. Electric Heater Capacity				3400	5100	6800	6800	6800	10200	10200	10200	10200
	Electrical	Fan motor power	H	3	W	17	29	38	50	75	84	100	145	156
			M	2		13	20	25	33	48	60	78	110	124
			L	1		8	12	14	19	30	40	55	65	92
		Fan Motor Running Current @ H 115V			A	0.34	0.56	0.7	0.9	1.84	1.56	1.96	3.36	3.38
		Fan Motor Running Current @ H 220V			A	0.17	0.28	0.35	0.45	0.92	0.78	0.98	1.68	1.69
	Sound	Sound Pressure Level			dB(A)	38/36/34	39/37/35	42/40/38	43/41/39	45/43/41	47/45/43	48/46/44	50/48/46	52/50/48
		Sound Power Level				50/48/42	52/49/45	55/52/48	58/55/52	60/57/53	60/57/55	64/60/58	66/63/59	69/67/65
	Hydraulic	Cooling Water Flow Rate	3		GPM	1.13	1.62	2.06	2.57	3.22	4.01	4.74	5.77	6.26
			2			0.99	1.44	1.78	2.22	2.82	3.60	4.42	5.26	5.88
			1			0.76	1.20	1.54	1.98	2.44	3.19	3.91	4.39	5.40
		Cooling Pressure Drop	3		Ft.wg	2.52	4.93	2.93	4.93	7.60	2.14	3.12	4.77	5.97
			2			2.00	4.03	2.28	3.80	6.07	1.78	2.78	4.07	5.37
			1			1.27	2.98	1.79	3.15	4.70	1.44	2.25	2.98	4.63
		Heating Water Flow Rate @3/2/1			GPM	Same as "Cooling Water Flow Rate"								
		Heating Pressure Drop	3		Ft.wg	2.02	3.95	2.34	3.95	6.08	1.71	2.49	3.81	4.77
			2			1.60	3.23	1.82	3.04	4.85	1.42	2.22	3.25	4.29
			1			1.02	2.38	1.43	2.52	3.76	1.15	1.80	2.39	3.71
		Water Content			gal	0.17	0.19	0.25	0.31	0.33	0.46	0.52	0.58	0.64
Construction and Package Data		Water Connections	Type			Socket (NPT Threaded Female)								
			In		in	3/4								
			Out											
		Condensate Drainage Connection												
		Dimensions	L		in	33.78	35.75	41.65	47.56	49.53	69.21	69.21	75.12	81.02
			W			9.84								
			H			19.45								
		Net Weight			lbs	49	53	57	66	71	104	104	108	119

a. Cooling mode (2-pipe/ 4-pipe):
- Return air temperature: 80.0F DB/ 67.0F WB.
- Inlet/ outlet water temperature: 45F/ 55F

b. Heating mode (2-pipe):
- Return air temperature: 70F.
- Inlet water temperature: 140F.
- Water flow-rate: same as cooling mode.

Product range: PFWB/PFWBC-AECM Universal Uncased/Cabinet Fan Coil with EC Motor

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PFWB(4R)-V~-AECM Universal Uncased Unit 4-row coil 2-pipe with EC Motor
PFWBC(4R)-V~-AECM Universal Cabinet Unit 4-row coil 2-pipe with EC Motor

		PFWB(C)(4R)-[Size]-V~-AECM				6	9	12	15	18	24	30	36	40
Unit Configuration		Configuration							2-pipe					
		Number Of Fan Blowers				Single	Twin				Four			
		Operation Control				~S: Complete function onboard PCB with integrated group control functionality. ~W: Flexible function onboard PCB with drain-pump, louver and zone control functionality.								
Performance Data	**Air**	Air Flow	H	3	CFM	196	296	386	466	609	794	926	1138	1207
			M	2		165	254	318	384	514	688	847	1006	1112
			L	1		116	201	265	331	424	582	720	794	995
	Cooling	Cooling Capacity	H	3	BTU/Hr	6592	9504	12304	15331	19315	25132	29542	35998	38828
			M	2		5734	8411	10574	13119	16858	22464	27548	32649	36412
			L	1		4346	7010	9128	11679	14466	19688	24198	27021	33331
		Sensible Cooling Capacity	H	3		4498	6504	8442	10415	13149	17168	20089	24424	26230
			M	2		3895	5734	7220	8873	11433	15295	18697	22097	24559
			L	1		2927	4752	6204	7874	9770	13353	16366	18199	22432
	Heating	Heating Capacity	H	3	BTU/Hr	10547	15206	19686	24530	30904	40211	47267	57597	62125
			M	2		9174	13458	16918	20990	26973	35942	44077	52238	58259
			L	1		6954	11216	14605	18686	23146	31501	38717	43234	53330
		Max. Electric Heater Capacity				3400	5100	6800	6800	6800	10200	10200	10200	10200
	Electrical	Fan motor power	H	3	W	17	29	38	50	75	84	100	145	156
			M	2		13	20	25	33	48	60	78	110	124
			L	1		8	12	14	19	30	40	55	65	92
		Fan Motor Running Current @ H 115V			A	0.34	0.56	0.7	0.9	1.84	1.56	1.96	3.36	3.38
		Fan Motor Running Current @ H 220V			A	0.17	0.28	0.35	0.45	0.92	0.78	0.98	1.68	1.69
	Sound	Sound Pressure Level			dB(A)	38/36/34	39/37/35	42/40/38	43/41/39	45/43/41	47/45/43	48/46/44	50/48/46	52/50/48
		Sound Power Level				50/48/42	52/49/45	55/52/48	58/55/52	60/57/53	60/57/55	64/60/58	66/63/59	69/67/65
	Hydraulic	Cooling Water Flow Rate		3	GPM	1.41	1.90	2.46	3.06	3.85	5.01	5.90	7.18	7.73
				2		1.14	1.68	2.11	2.62	3.36	4.49	5.50	6.51	7.26
				1		0.87	1.40	1.82	2.33	2.88	3.93	4.82	5.39	6.64
		Cooling Pressure Drop		3	Ft.wg	1.46	2.89	2.43	4.07	6.33	4.17	6.07	9.33	11.50
				2		1.15	2.35	1.87	3.12	5.00	3.43	5.40	7.87	10.30
				1		0.47	1.72	1.46	2.55	3.83	2.75	4.30	5.67	8.83
		Heating Water Flow Rate @3/2/1			GPM	Same as "Cooling Water Flow Rate"								
		Heating Pressure Drop		3	Ft.wg	1.17	2.31	1.94	3.25	5.07	3.33	4.85	7.47	9.20
				2		0.92	1.88	1.50	2.49	4.00	2.75	4.32	6.29	8.24
				1		0.38	1.38	1.17	2.04	3.07	2.20	3.44	4.53	7.07
		Water Content			gal	0.23	0.26	0.3	0.42	0.44	0.61	0.69	0.77	0.85
Construction and Package Data		Water		Type		Socket (NPT Threaded Female)								
		Connections		In	in	3/4"								
				Out										
		Condensate Drainage Connection												
		Dimensions		L	in	33.78	35.75	41.65	47.56	49.53	69.21	69.21	75.12	81.02
				W		9.84								
				H		19.45								
		Net Weight			lbs	49	53	57	66	71	104	104	108	119

a. Cooling mode (2-pipe):

- Return air temperature: 80.0F DB/ 67.0F WB.
- Inlet/ outlet water temperature: 45F/ 55F

b. Heating mode (2-pipe):

- Return air temperature: 70F.
- Inlet water temperature: 140F.
- Water flow-rate: same as cooling mode.

A.3.2.   4-Pipe Systems

Product range: PFWB/PFWBC-AECM Universal Uncased/Cabinet Fan Coil with EC Motor

PFWB(3+1R)-P~-AECM Universal Uncased Unit with EC Motor - Auxiliary Heating Coil (1 row)
PFWBC(3+1R)-P~-AECM Universal Cabinet Unit with EC Motor - Auxiliary Heating Coil (1 row)

PFWBC(3R+1)-[Size]-p~-AECM						6	9	12	15	18	24	30	36	40
Unit Configuration		Configuration				2-pipe								
		Number Of Fan Blowers				Single	Twin				Four			
		Operation Control				~S: Complete function onboard PCB with integrated group control functionality. ~W: Flexible function onboard PCB with drain-pump, louver and zone control functionality.								
Performance Data	Air	Air Flow	H	3	CFM	196	296	386	466	609	794	926	1138	1207
			M	2		165	254	318	384	514	688	847	1006	1112
			L	1		116	201	265	331	424	582	720	794	995
	Heating	Heating Capacity	H	3	BTU/Hr	5653	7859	10438	12887	15834	20455	23831	28643	31042
			M	2		5006	7059	9105	11239	14052	18501	22387	26272	29306
			L	1		3897	5985	8003	10114	12265	16447	19970	22242	27101
	Hydraulic	Heating Water Flow Rate		3	GPM	0.28	0.39	0.52	0.64	0.79	1.02	1.19	1.43	1.55
				2		0.25	0.35	0.45	0.56	0.70	0.92	1.12	1.31	1.46
				1		0.19	0.30	0.40	0.50	0.61	0.82	1.00	1.11	1.35
		Heating Pressure Drop		3	Ft.wg	0.36	0.67	1.31	2.18	3.28	0.97	1.40	2.11	2.63
				2		0.29	0.56	1.03	1.72	2.66	0.82	1.25	1.81	2.38
				1		0.19	0.42	0.82	1.43	2.09	0.66	1.03	1.35	2.07
		Water Content			gal	0.06	0.07	0.08	0.1	0.11	0.15	0.17	0.19	0.21

Notes:

1: Heating conditions (2-pipe)
       - Return air temperature: 70F.
       - Inlet/outlet water temperature: 180/140F.

A.4. Coil Data

A.4.1. 2-Pipe Systems

COIL DATA (2 PIPE SYSTEM 3 ROW)

Model	Fin height (mm)	Fin Length (mm)	Fins per Inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
PFWB(C)-06		441				2	
PFWB(C)-09		491				2	
PFWB(C)-12		641				3	
PFWB(C)-15		791				3	
PFWB(C)-18	200	841	12.7	3	66	3	9.52
PFWB(C)-24		1311				6	
PFWB(C)-30		1311				6	
PFWB(C)-36		1462				6	
PFWB(C)-40		1611				6	

COIL DATA (2 PIPE SYSTEM 4 ROW)

Model	Fin height (mm)	Fin Length (mm)	Fins per Inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
PFWB(C)-06		441				3	
PFWB(C)-09		491				3	
PFWB(C)-12		641				4	
PFWB(C)-15		791				4	
PFWB(C)-18	200	841	12.7	4	88	4	9.52
PFWB(C)-24		1311				6	
PFWB(C)-30		1311				6	
PFWB(C)-36		1462				6	
PFWB(C)-40		1611				6	

A.4.2. 4-Pipe Systems

HEATING COIL DATA (4 PIPE SYSTEM WITH 1 ROW REMOVABLE HEATING COIL)

Model	Fin height (mm)	Fin Length (mm)	Fins per Inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
PFWB(C)-06		441					
PFWB(C)-09		491					
PFWB(C)-12		641				1	
PFWB(C)-15		791					
PFWB(C)-18	200	841	12.7	1	22		9.52
PFWB(C)-24		1311					
PFWB(C)-30		1311					
PFWB(C)-36		1462				2	
PFWB(C)-40		1611					

A.5. Unit sound data

Sound Power

Size	06			09			12			15			18		
Speed	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
31.5Hz	0.6	3.9	5.2	3.5	1.1	5.1	13.8	10.3	8.4	9.7	6.9	6.7	5.5	4.6	1.7
63Hz	6.6	3.3	4.8	7.4	6.3	6.4	7.6	10.5	5.7	11.9	9.7	7.1	11.6	5.6	3.9
125Hz	11.7	8.4	4.9	17.8	11.3	6.8	19.1	16.6	11.1	24.3	17.0	13.3	23.7	18.7	16.0
250Hz	24.9	19.0	15.8	27.2	23.0	19.9	33.0	28.2	24.7	34.7	31.8	28.2	38.8	33.1	28.9
500Hz	34.9	25.8	19.9	32.1	28.3	23.5	39.7	33.1	27.1	41.9	37.4	33.3	42.9	38.0	35.0
1000Hz	30.5	21.2	16.0	34.9	28.0	22.9	41.0	31.8	26.8	40.6	36.2	30.5	44.1	36.9	33.2
2000Hz	24.5	15.6	12.1	30.0	22.2	17.6	35.3	26.0	18.6	37.5	31.1	24.3	40.0	33.1	26.9
4000Hz	17.7	13.3	13.2	22.6	15.3	13.3	27.0	17.2	13.7	29.8	21.7	15.9	32.6	24.2	18.6
8000Hz	12.6	11.8	11.8	13.9	12.0	11.8	15.2	12.2	11.9	18.8	13.8	12.4	22.9	15.2	13.2
16000Hz	3.3	4.0	4.1	4.4	4.3	4.3	4.4	4.3	4.2	5.1	4.4	4.4	6.1	4.7	4.5
A-weight sound power Lw dBA	**39.5**	**32.9**	**28.7**	**43.3**	**37.3**	**33.1**	**48.1**	**41.1**	**36.2**	**50.4**	**44.8**	**40.2**	**52.2**	**46.4**	**41.4**

Sound Pressure in 1/3 Octave-bands. (unit: dB)

Size	24			30			36			40		
Speed	H	M	L	H	M	L	H	M	L	H	M	L
31.5Hz	4.6	3.1	0.5	10.9	11.7	14.1	17.4	10.4	12.0	17.8	18.2	24.4
63Hz	11.6	8.3	6.9	15.6	16.9	16.1	16.9	15.7	13.9	17.5	29.1	29.7
125Hz	25.2	21.5	17.2	31.1	28.8	25.8	35.2	31.4	28.1	28.6	31.8	35.4
250Hz	37.9	33.0	30.1	46.0	40.8	39.7	46.8	44.4	37.8	45.8	50.1	52.1
500Hz	42.2	37.4	35.6	51.5	48.2	45.6	49.6	48.6	44.2	47.8	50.7	52.7
1000Hz	46.1	40.1	36.1	51.5	47.6	44.7	53.5	50.8	46.1	50.7	54.1	56.7
2000Hz	41.2	34.5	29.9	47.7	43.8	39.6	50.1	46.2	40.4	46.0	48.9	52.0
4000Hz	33.9	26.0	20.3	41.0	35.6	31.1	42.9	38.7	31.3	40.1	44.7	48.1
8000Hz	22.5	15.1	12.7	31.1	24.6	19.9	32.3	27.4	20.0	27.1	32.1	36.0
16000Hz	5.7	4.4	4.3	10.9	8.2	7.3	11.5	8.4	7.2	8.3	11.2	14.3
A-weight sound power Lw dBA	**53.6**	**48.2**	**44.2**	**59.8**	**56.1**	**53.6**	**61.4**	**58.4**	**53.5**	**64.6**	**62.1**	**58.4**

Sound Pressure in 1/3 Octave-bands. (unit: dB)

Sound pressure

Size			06			09			12			15			18
Speed	**H**	**M**	**L**	**H**	**M**	**L**	**H**	**M**	**L**	**H**	**M**	**L**	**H**	**M**	**L**
31.5Hz	-8.6	-5.3	-4.0	-5.8	-8.1	-4.2	4.6	1.1	-0.9	0.5	-2.3	-2.5	-3.7	-4.7	-7.5
63Hz	-2.6	-5.9	-4.4	-1.9	-2.9	-2.8	-1.6	1.3	-3.5	2.7	0.5	-2.1	2.3	-3.6	-5.4
125Hz	2.5	-0.9	-4.3	8.6	2.0	-2.4	9.9	7.4	1.9	15.1	7.7	4.0	14.4	9.5	6.8
250Hz	15.7	9.8	6.5	18.0	13.8	10.7	23.7	18.9	15.5	25.5	22.5	18.9	29.6	23.9	19.7
500Hz	25.7	16.6	10.6	22.8	19.1	14.3	30.5	23.9	17.9	32.7	28.2	24.0	33.6	28.8	25.7
1000Hz	21.3	12.0	6.8	25.6	18.8	13.7	31.8	22.6	17.6	31.4	27.0	21.3	34.9	27.7	23.9
2000Hz	15.3	6.4	2.9	20.8	12.9	8.4	26.1	16.7	9.3	28.3	21.9	15.0	30.8	23.9	17.7
4000Hz	8.5	4.1	3.9	13.4	6.0	4.0	17.8	8.0	4.5	20.5	12.5	6.6	23.4	14.9	9.4
8000Hz	3.4	2.6	2.5	4.7	2.8	2.5	5.9	2.9	2.6	9.6	4.6	3.2	13.7	6.0	3.9
16000Hz	-5.9	-5.3	-5.1	-4.9	-5.0	-4.9	-4.8	-5.0	-5.0	-4.2	-2.4	-4.9	-3.1	-4.5	-4.7
A-weight sound pressure Lp dBA	**30.3**	**23.7**	**19.5**	**34.1**	**28.1**	**23.9**	**38.9**	**31.9**	**27.0**	**41.2**	**35.6**	**31.0**	**43.0**	**37.0**	**32.2**

Sound Power in 1/3 Octave-bands. (unit: dB)

Size			24			30			36			40
Speed	**H**	**M**	**L**	**H**	**M**	**L**	**H**	**M**	**L**	**H**	**M**	**L**
31.5Hz	-4.7	-6.2	-8.7	1.7	2.5	4.9	8.2	1.1	2.8	8.5	9.0	15.2
63Hz	2.3	-0.9	-2.4	6.4	7.7	6.9	7.7	6.4	4.7	8.2	19.9	20.5
125Hz	16.0	12.3	8.0	21.9	19.6	16.6	25.9	22.2	18.9	19.4	22.5	26.1
250Hz	28.7	23.7	20.9	36.8	31.6	30.4	37.6	35.1	28.6	36.5	40.9	42.8
500Hz	33.0	28.2	26.4	42.3	39.0	36.4	40.4	39.4	34.9	38.6	41.5	43.5
1000Hz	36.9	30.9	26.8	42.3	38.4	35.5	44.3	41.6	36.9	41.4	44.9	47.5
2000Hz	32.0	25.2	20.6	38.5	34.5	30.4	40.9	37.0	31.2	36.8	39.7	42.8
4000Hz	24.7	16.8	11.1	31.8	26.4	21.8	33.6	29.4	22.1	30.8	35.5	38.9
8000Hz	13.3	5.9	3.5	21.8	15.4	10.7	23.0	18.2	10.7	17.9	22.9	26.7
16000Hz	-3.5	-4.8	-5.0	1.7	-1.1	-1.9	2.3	-0.8	-2.0	-0.9	2.0	5.1
A-weight sound pressure Lp dBA	**44.4**	**39.0**	**35.0**	**50.6**	**46.9**	**44.4**	**52.2**	**49.1**	**44.3**	**55.4**	**52.8**	**49.2**

Sound Power in 1/3 Octave-band (unit: dB)

A.6. Dimensional Drawings
Dimensional Drawings: PFWB series

R3/4"Drainage

Rp3/4 CHILLED WATER OUTLET

Rp1/2 HOT WATER OUTLET

Rp1/2 HOT WATER INLETET

40°

Rp3/4 CHILLED WATER INLET

Fan Blower+motor
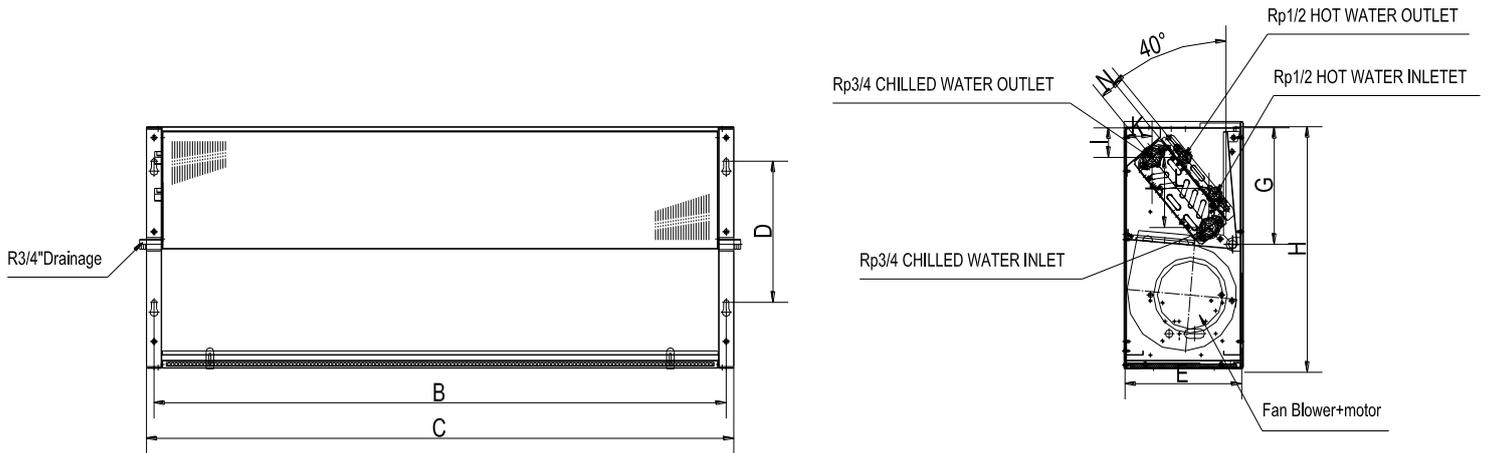
Model	B	C	D	E	G	H	I	J	K	L	N
PFWB-06-P	22.76	23.94	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-09-P	24.72	25.91	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-12-P	30.63	31.81	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-15-P	36.54	37.72	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-18-P	38.50	39.69	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-24-P	52.28	53.46	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-30-P	58.19	59.37	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-36-P	64.09	65.28	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97
PFWB-40-P	70.00	71.18	10.63	9.84	19.06	19.45	2.24	5.28	2.05	4.43	1.97

(All dimensions shown in inch)

Dimensional Drawings: PFWBC series

Rp3/4 CHILLED WATER OUTLET
Rp1/2 HOT WATER OUTLET
Rp1/2 HOT WATER INLETET
Rp3/4 CHILLED WATER INLET
Fan Blower+motor
R3/4"Drainage
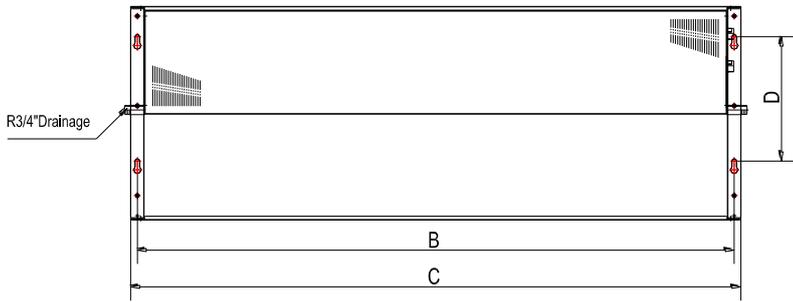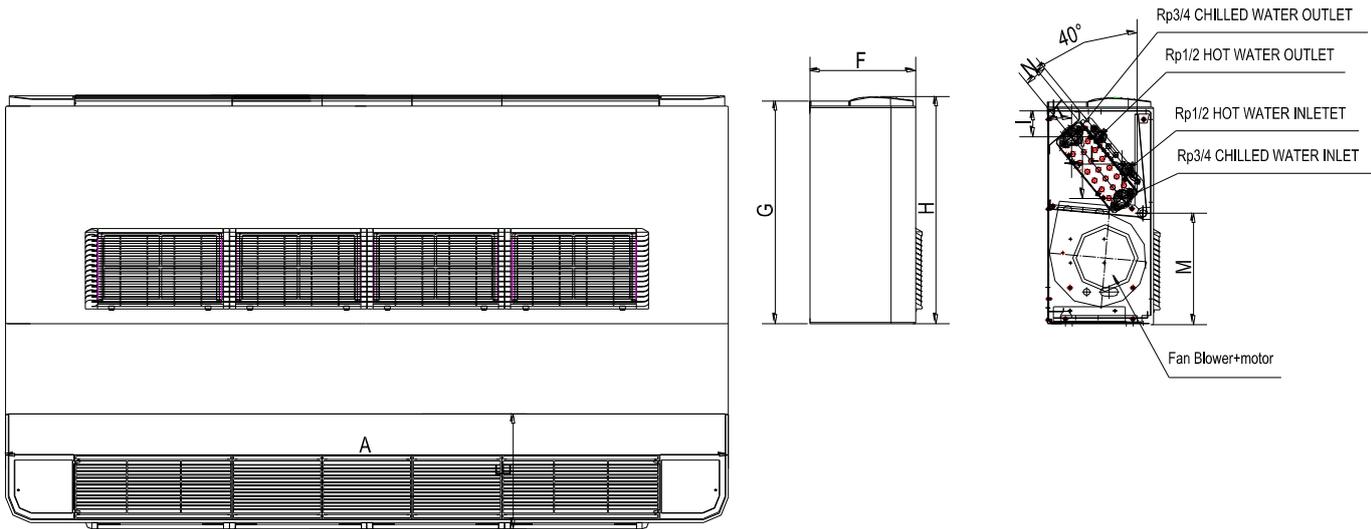
Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N
PFWBC-06	33.78	22.76	23.94	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-09	35.75	24.72	25.91	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-12	41.65	30.63	31.81	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-15-P	47.56	36.54	37.72	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-18-P	49.53	38.50	39.69	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-24-P	63.31	52.28	53.46	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-30-P	69.21	58.19	59.37	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-36-P	75.12	64.09	65.28	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97
PFWBC-40-P	81.02	70.00	71.18	10.63	9.84	9.25	19.06	19.45	2.24	5.28	2.05	4.43	9.53	1.97

(All dimensions shown in inch)

A.7. Valve Information (Optional Parts)

A.7.1. On/off Valve Model Definitions

2-Way 3/4" Valve Body
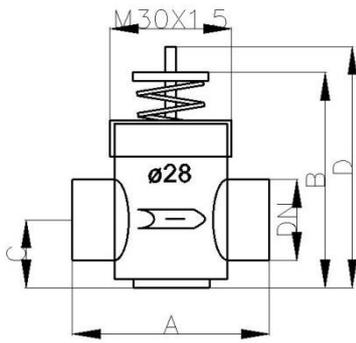
Valve Code (valve body + ON/ OFF thermoelectric actuator)	Valve Body Dimensions (mm)				
	DN	A	B	C	D
SGS14HFCA-23010101	D20 (G3/4")	2.2	1.85	0.87	2.48

3-Way 3/4" Valve Body
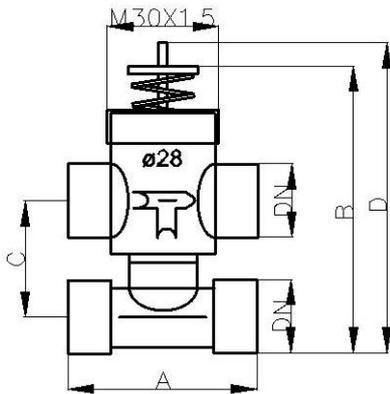
Valve Code (valve body + ON/ OFF thermoelectric actuator)	Valve Body Dimensions (mm)				
	DN	A	B	C	D
SGS14HFCA-23010102	D20 (G3/4")	2.2	3.46	1.97	4.09

Differential Pressure Chart
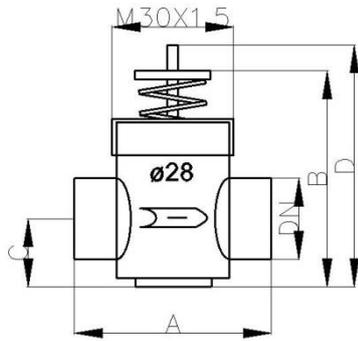
DN 3/4"KV 2.5

2-Way 1/2" Valve Body

Valve Code (valve body + ON/ OFF thermoelectric actuator)	Valve Body Dimensions (mm)				
	DN	A	B	C	D
SGS14HFCA-23020101	D15 (G1/2")	2.05	1.85	0.77	2.48

3-Way 1/2" Valve Body
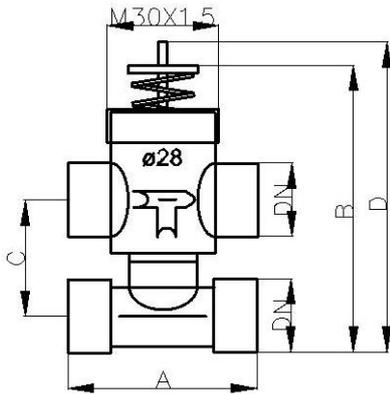
Valve Code (valve body + ON/ OFF thermoelectric actuator)	Valve Body Dimensions (mm)				
	DN	A	B	C	D
SGS14HFCA-23020102	D15 (G1/2")	2.05	2.76	1.57	3.39

Differential Pressure Chart

DN 1/2" KV 1.6
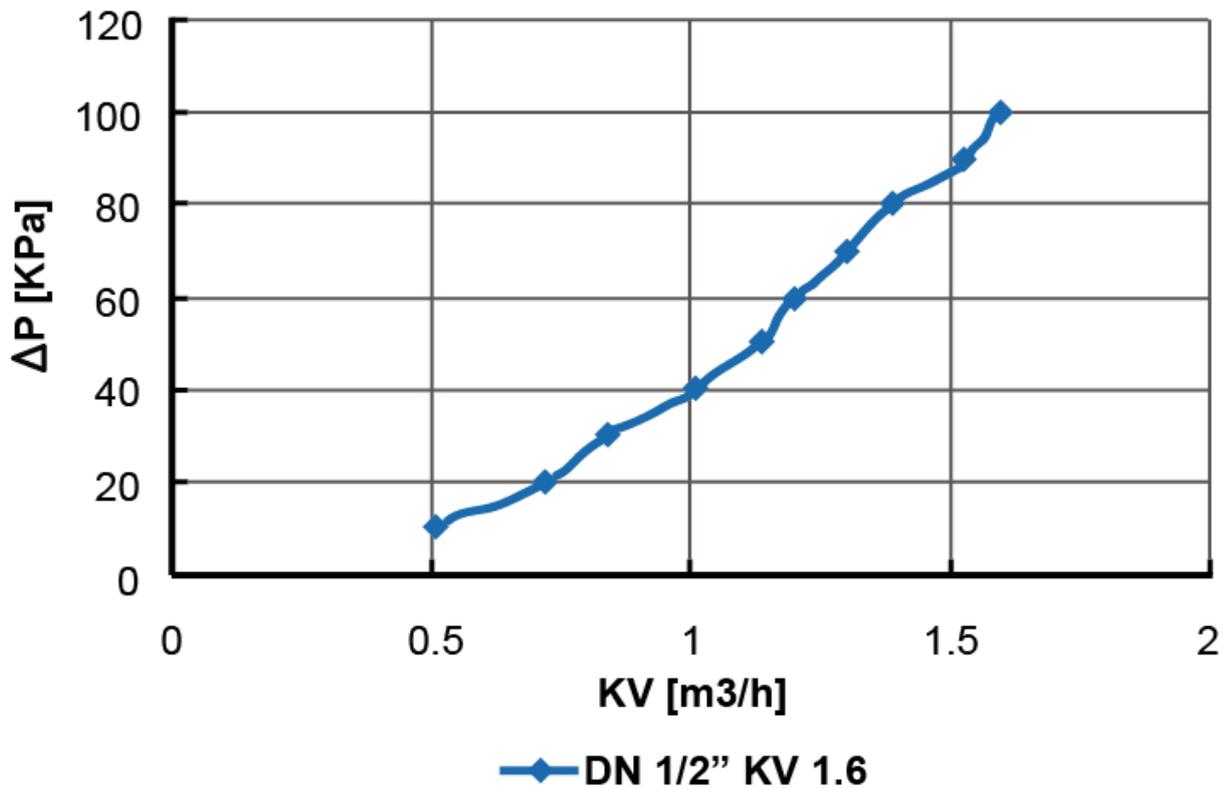
A.7.2. Modulating Valve Model Definitions

SGS14HFCA-23050201
3/4" inch 2-way modulating valve and 24VAC actuator with 0-10VDC input which is used with unit
SGS14HFCA-23050202
3/4" inch 3-way modulating valve and 24VAC actuator with 0-10VDC input which is used with unit
SGS14HFCA-25020101
1 set stainless steel hose and copper piping connection kit for 3/4" 3-way
SGS14HFCA-25020102
1 set stainless steel hose and copper piping connection kit for 3/4" 2-way

Technical Data

- 24V AC power supply
- 0~10VDC control signal
- Bi-directional modulating proportional control.
- Working media: cool/hot water or with 60% glycol
- Media Temp. Range: 34°F to 203°F (1°C to 95°C)
- Rating pressure：2.0MPa
- Max. Differential Pressure：0.3MPa
- Opening or closing time：50 sec.（50Hz）、40 sec.（60Hz）
- Connection: NPT internal thread

Dimensions

Size	Type	Kv Value	Dimension (inch)				
			C	D	E	F	G
3/4"	2-way	4.6	4.53	2.87	2.64	3.50	3.54
3/4"	3-way	4.6	5	2.87	2.64	3.50	3.54
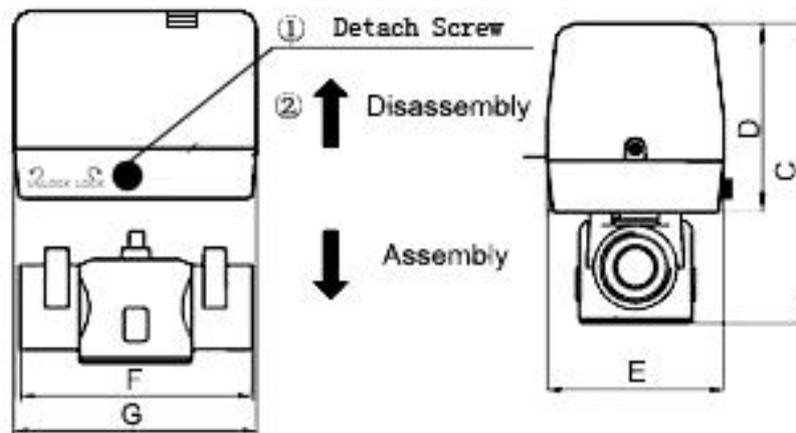
A.8. Low Voltage 24V Controls (Optional Parts)

Model	Description	Photo
SGS14HFCA-27000201	Mechanical Thermostat used for 2-pipe unit • 3-speed control • 1 on/off valve control	
SGS14HFCA-27000202	Mechanical Thermostat used for 4-pipe unit • 3-speed control • 2 on/off valves control	
SGS14HFCA-27000203	Digital Thermostat used for 2-pipe unit • 3-speed control • 1 on/off valve control • Auto changeover	
SGS14HFCA-27000204	Digital Thermostat used for 4-pipe unit • 3-speed control • 2 on/off valves control • Auto changeover	
SGS14HFCA-27000205	Digital Thermostat used for 2-pipe unit • 3-speed control • 1 modulating valve control • Auto changeover	
SGS14HFCA-27000206	Digital Thermostat used for 4-pipe unit • 3-speed control • 2 modulating valves control • Auto changeover	
SGS14HFCA-27000207	Digital Thermostat used for 2-pipe/4-pipe unit • 3-speed control • 2 on/off valves control • Auto changeover • Timer mode: 7 days 4 events	

B. Safety Precautions

- When installing, performing maintenance or servicing the air conditioning equipment, observe the precautions stated in this manual, in addition to those stated in 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 mains supply, with respect to the rating label on the unit is used.

- Power supply should be incorporated in the fixed wiring and must have a contact separation gap of at least 3mm in between each active phase of conductors.

- If the supply cord is damaged, it must be replaced by qualified personnel.

- Installing and servicing air conditioning equipment should be done 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.

> **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 working. Turn off the unit BEFORE turning off the main power.*

B.1. Installation

INSTALLATION OF FAN COIL DUCTED UNIT

B.1.1. Installation Procedure

The unit location should be established by the installation designer, services engineer or by a technically competent person before installation. It should take into account the technical requirements as well as the relevant current laws and regulations. The fan coil should be installed by a qualified company, also in accordance with the relevant laws and regulations of the country of installation.

The fan coils are designed for exposed installation. All the models are designed to be floor free standing, wall mounted or suspended from the ceiling. Installation should allow the treated air to circulate freely throughout the room and leave sufficient space to access the unit, in order to carry out maintenance or servicing operations.

FOR FLOOR FREE STANDING

1. Open the top left and right covers to loosen the 8 screws.
2. Lift and remove the cover.
3. Install the unit on the wall
4. Complete the hydraulic connection and check for leakage.
5. Complete the electrical connection as shown in the wiring diagrams.
6. Remount the cover.
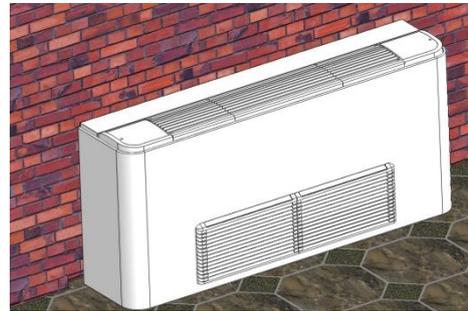
FOR WALL-MOUNTED

1. Open the top left and right covers to loosen the 8 screws
2. Lift and remove the cover.
3. Keep a minimum clearance of 80mm from the floor.
4. Secure the mounting brackets to the wall, then suspend the unit by the mounting brackets, as shown in figure.
5. Complete the hydraulic connection and check for leakage.
6. Complete the electrical connection as shown in the wiring diagrams.
7. Remount the cover.
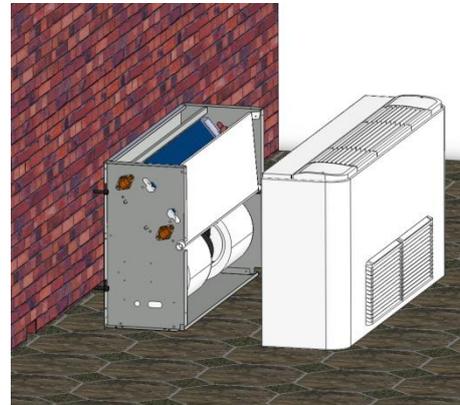
FOR CEILING-MOUNTED

1. Open the top left and right covers to loosen the 8 screws.
2. Lift and remove the cover.
3. Secure the mounting brackets to the ceiling, then suspend the unit by the mounting brackets. To correctly position flanges and brackets, see the dimensional data.
4. Complete the hydraulic connection and check for leakage.
5. Complete the electrical connection as shown in the wiring diagrams Make electrical connection as shown in the wiring diagrams.
6. Remount the cover.
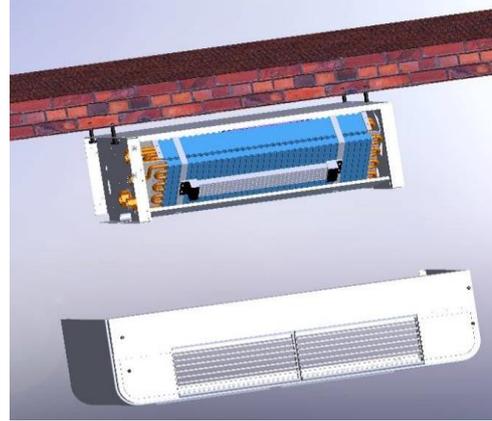
If it is necessary to remove the front panel, please refer to below procedure

Note: Open the top cover1 and 2 as shown above. Loosen eight 8 screws inside. The cabinet can be easily removed.

8 Screws

Top cover 2

Top cover 1
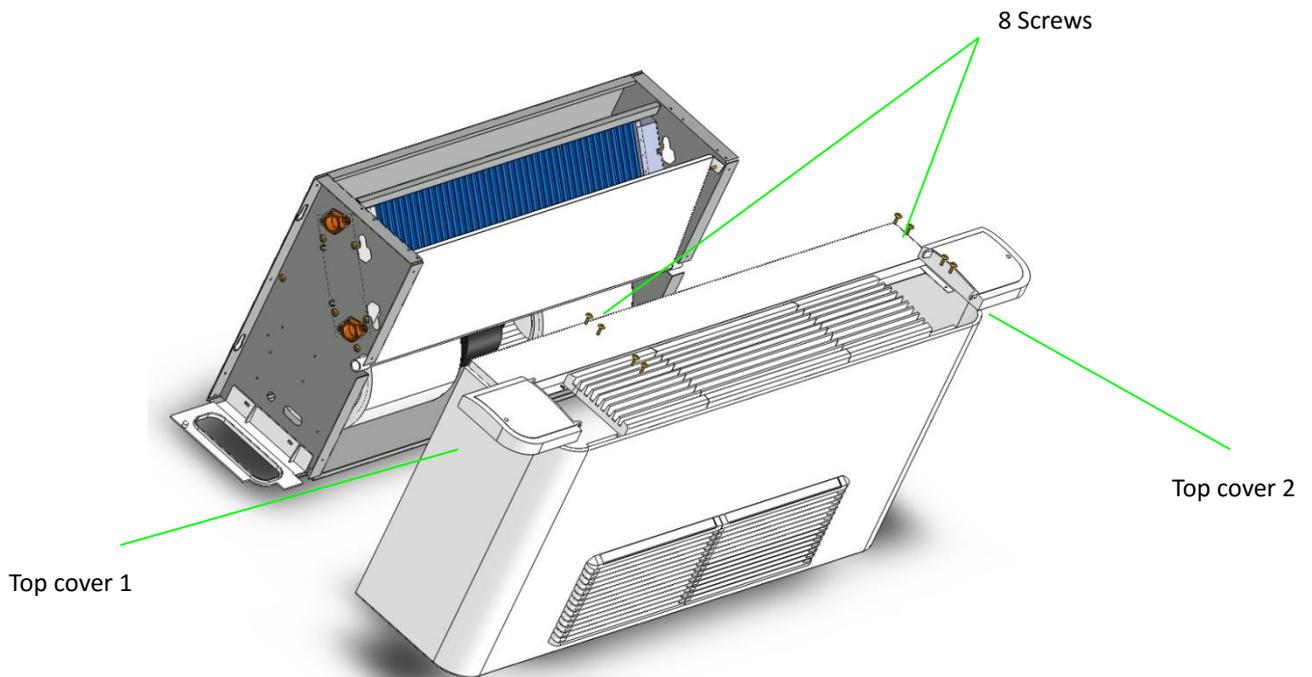
B.1.2. Piping Connections

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
The position of the water fittings may be reversed from left to right during installation.
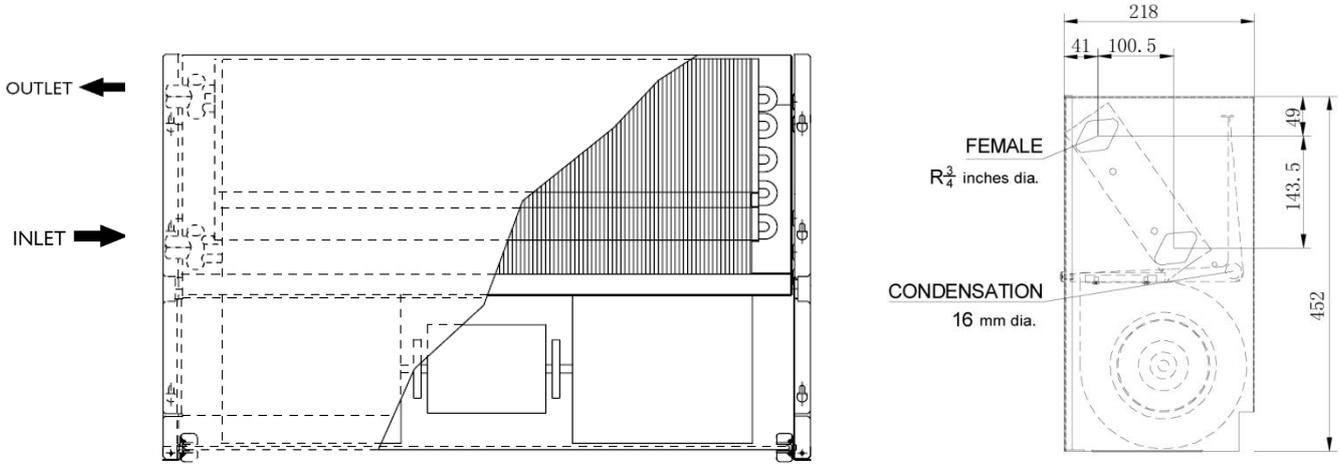
Installation water connections diagram

| 1. Fan | 2. Heat exchanger | 3. Manual bleeds | 4. Joint | 5 Ball on/off valve |
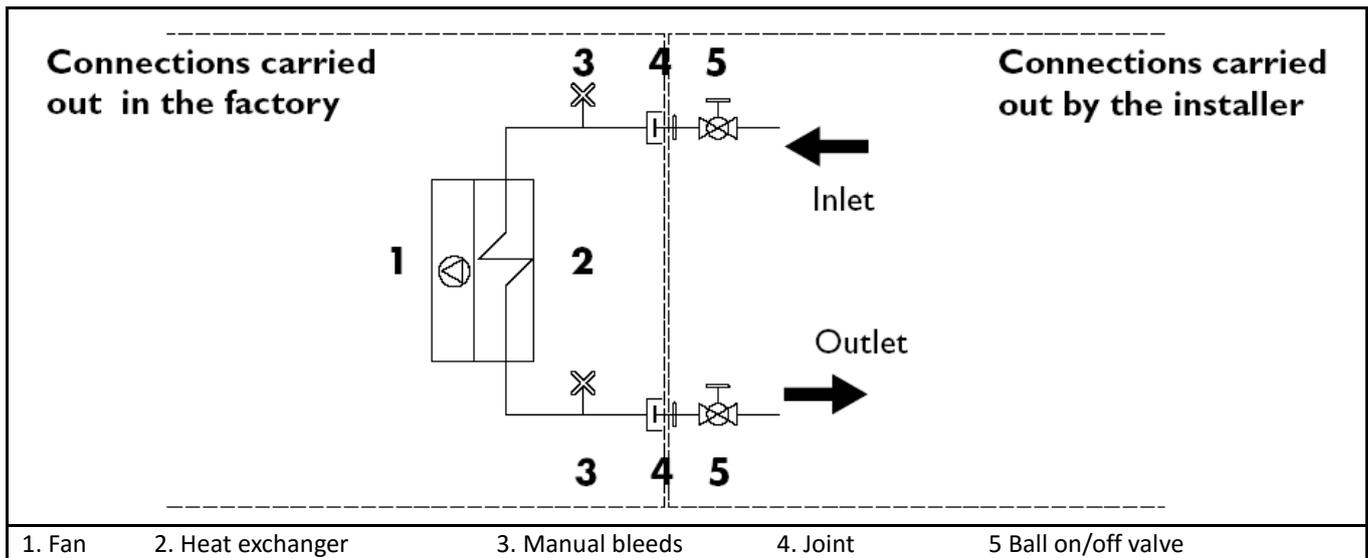
Attach the connections by tightening

the fan coil fitting using 2 wrenches.
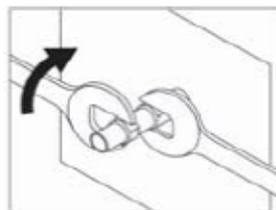
CONDENSATE DRAINAGE

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 ⌀ 0.63 inch) 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.

B.1.3. How to Interchange Left / Right Side Connection

Step 1: Remove the front panel.

Step 2: Remove 2 screws on the coil's metal plate.

Step 3: Remove 8 screws from both sides of the coil, then take out coil.

Step 2

Step 3
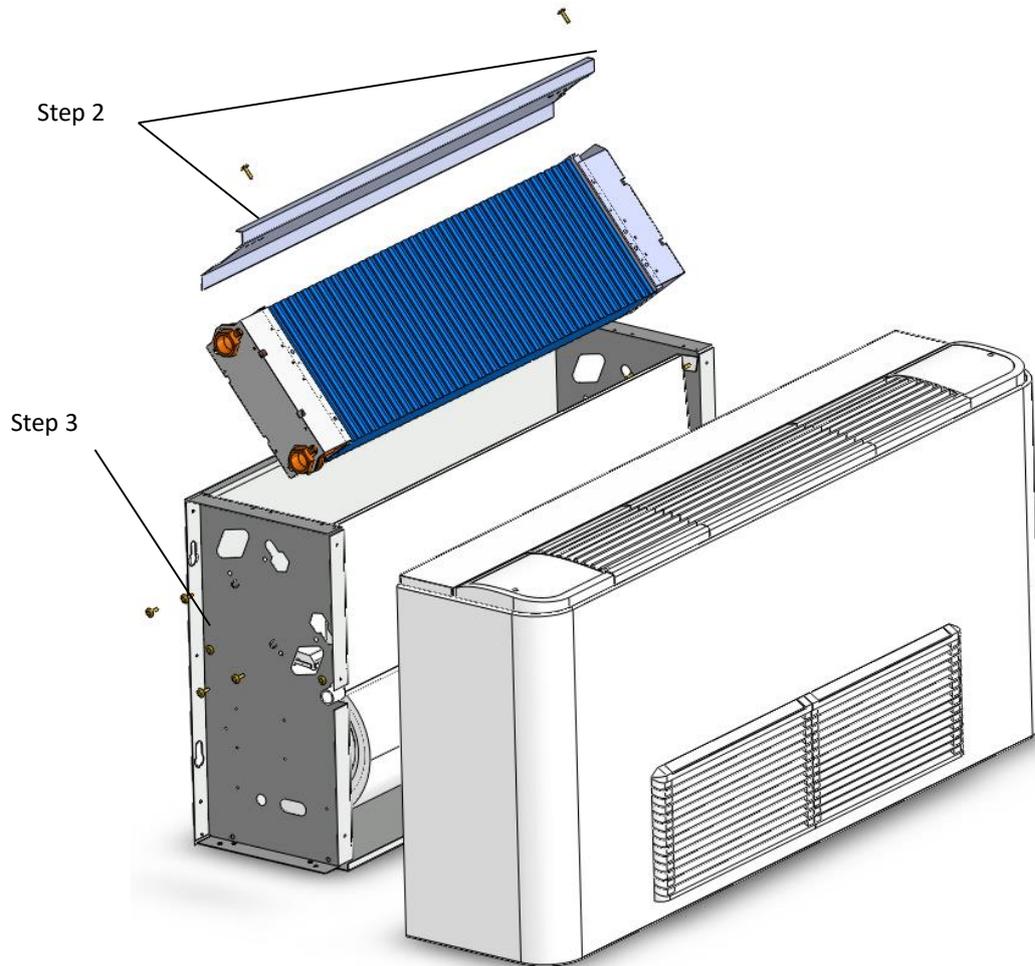
Step 4: Change the coil direction and screw back into the casing. Replace the front panel.
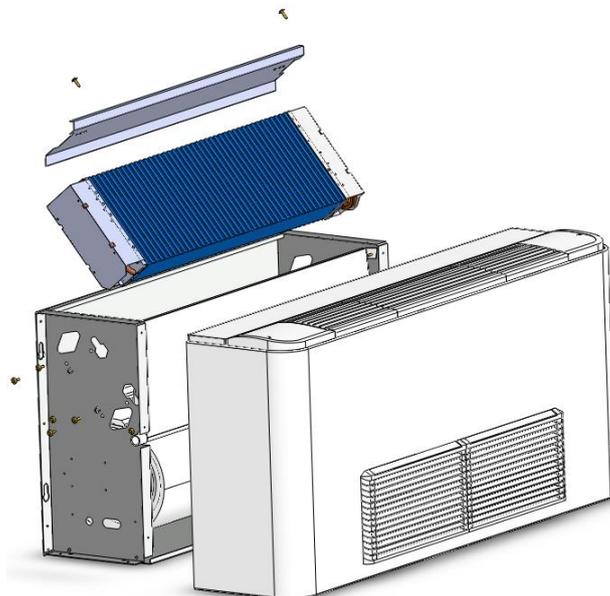
B.1.4.   Electrical Connection

The fan coil comes fully wired and only requires connecting to the mains electricity supply and to any room controls.
It is also recommended to check that:
-    The characteristics of the mains electricity supply are suitable for the input indicated in the table below, which (with maximum values) should serve for sizing both the circuit breakers and the power cables (any other appliances working in parallel should also be taken into consideration).
-    The supply voltage corresponds to the rated value +/- 10%.

B.1.5.   Valve and External drain pan Installation

Horizontal type

Piping for 2-Pipe System

- 3-Way 4 Outlet Valve 3/4"
- Water Outlet 3/4"
- Water Inlet 3/4"
- Horizontal Drain Pan

Piping for 4-Pipe System

- 3-Way 4 Outlet Valve 1/2" for Heating Coil
- 3-Way 4 Outlet Valve 3/4" for Cooling Coil
- Cold Water Outlet 3/4"
- Hot Water Outlet 1/2"
- Cold Water Inlet 3/4"
- Hot Water Inlet 1/2"
- Horizontal Drain Pan
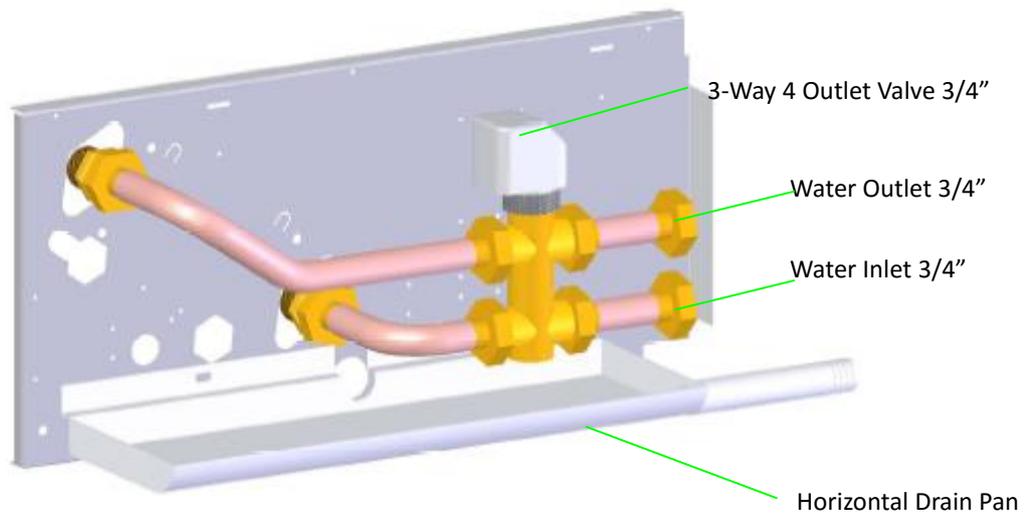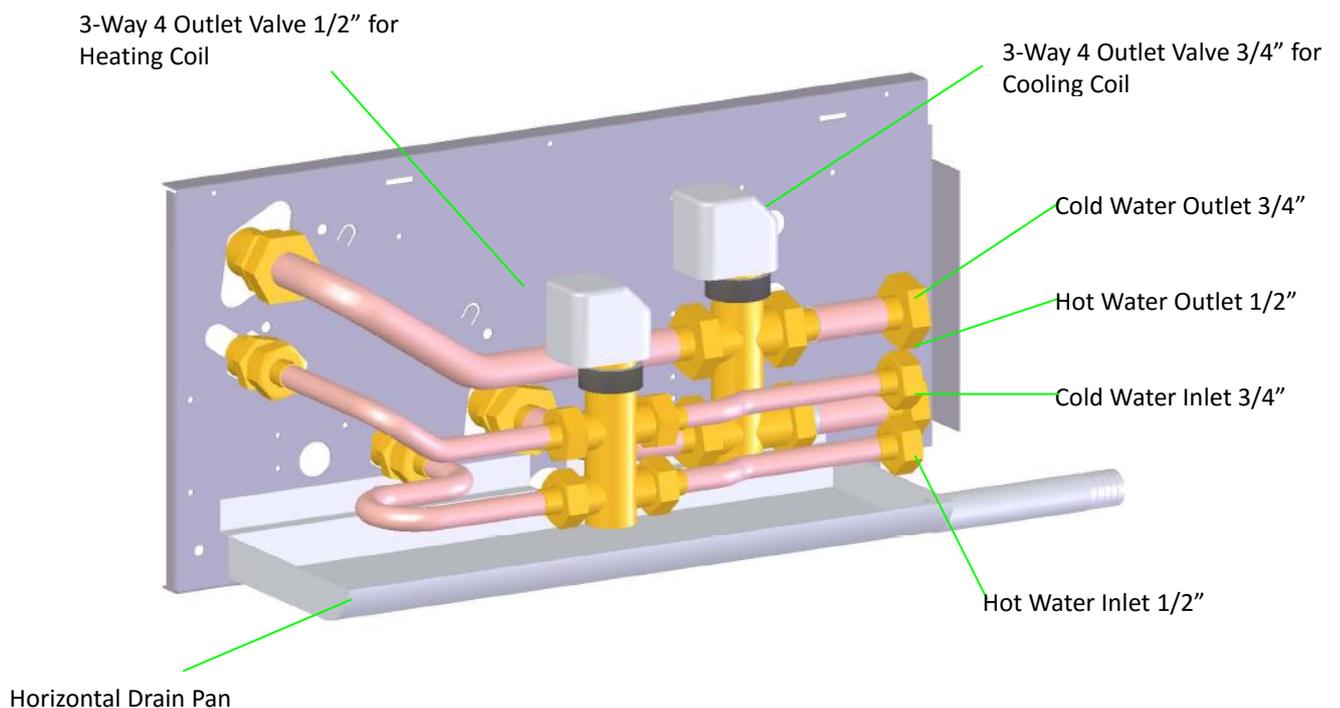
Vertical type

Piping for 2-Pipe System

3-Way 4 Outlet Valve 3/4"

Vertical Drain Pan

Water Outlet 3/4"

Water Inlet 3/4"

Piping for 4-Pipe System

3-Way 4 Outlet Valve 1/2" for
Heating Coil

3-Way 4 Outlet Valve 3/4" for
Cooling Coil

Vertical Drain Pan

Hot Water Outlet 1/2"   Hot Water Inlet 1/2"

Cold Water Outlet 3/4"

Cold Water Inlet 3/4"
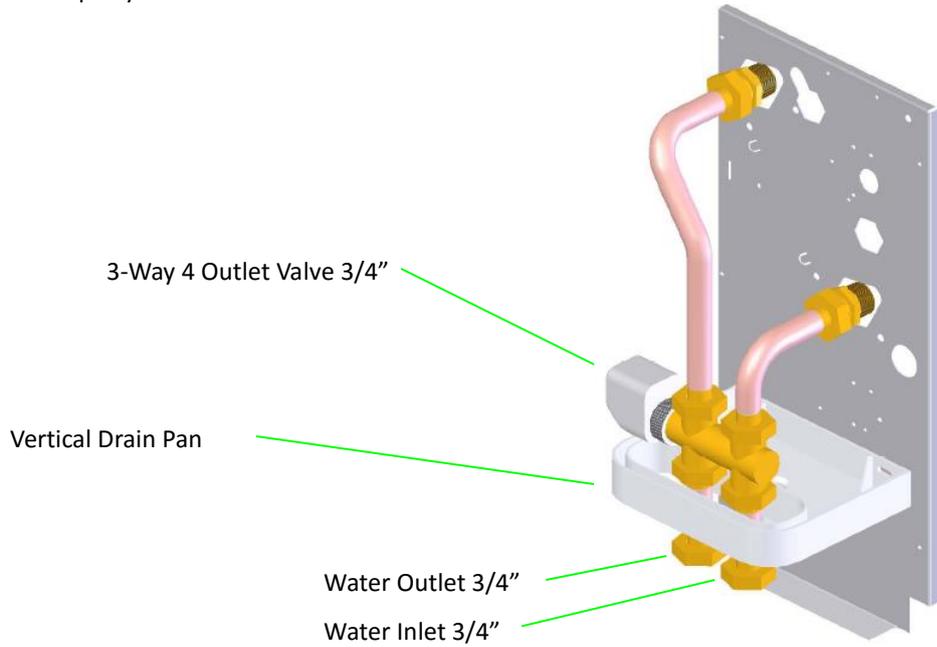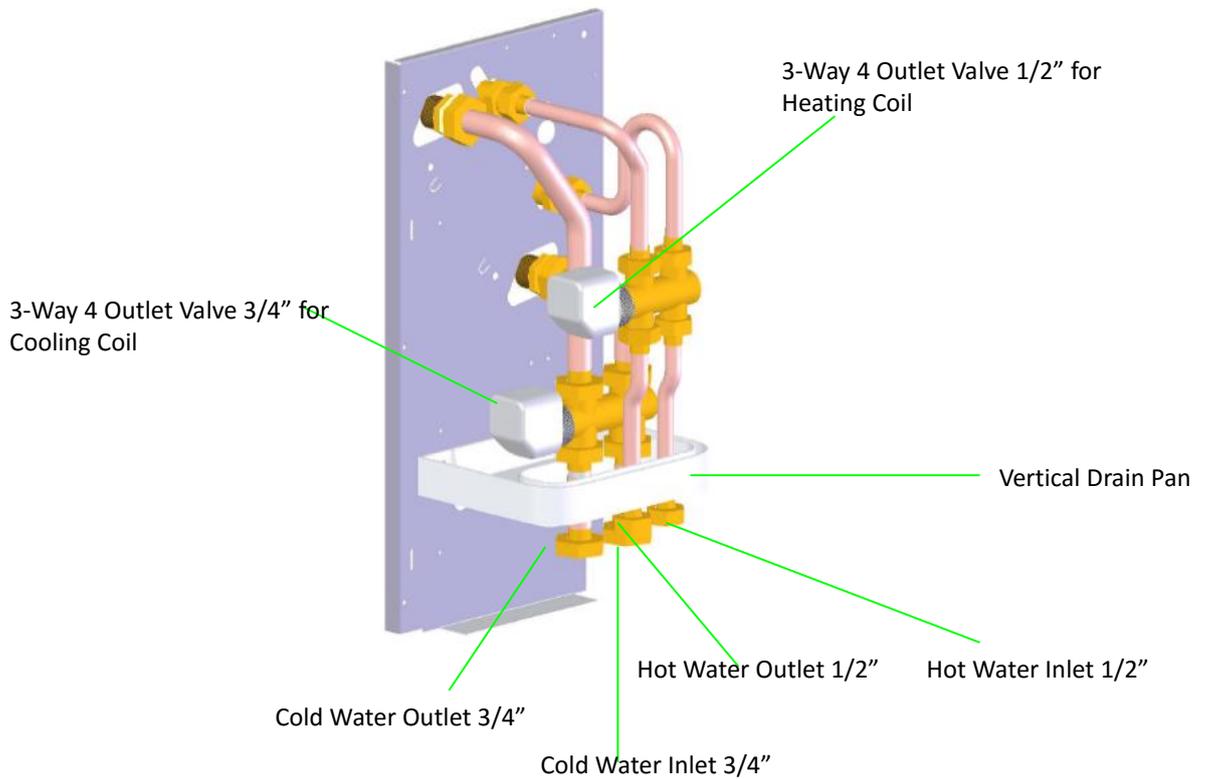
IMPORTANT
Gravity drainage may be converted into forced drainage by attaching the condensate drain pump available as an accessory.

C. Maintenance

C.2. 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 that the unit has been switched OFF before installing or servicing the unit.
3. A good general maintenance plan will prevent damage to and unexpected shutting down of the equipment.
4. Dirty filters reduce air flow as well as unit performance. Therefore, changing or cleaning the filters is very important. Check the cleanliness of the filter and replace or clean as required monthly.
5. Coils should be cleaned 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.3. 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.4. Filter Installation & Cleaning

1. Insert the top edge of the filter into the top of the casing as shown below.
2. Push the bottom edge of the filter up and fit it into the casing.
3. Reverse the procedure to remove the filter
4. Clean the filter with a brush, or with warm water.
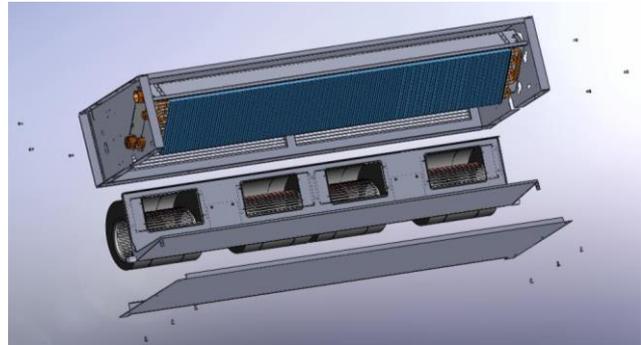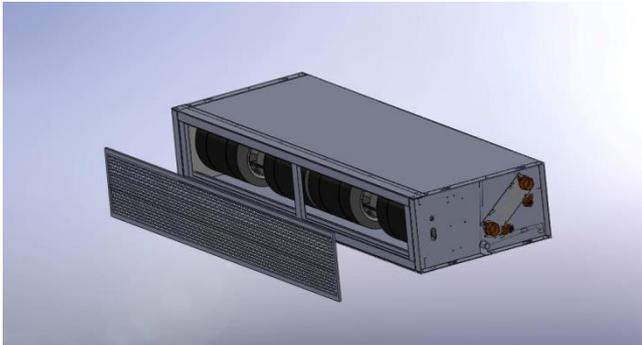
C.5. Fan-Motor Assembly Maintenance

Step 1: Remove the front panel.

Step 2: Loosen 6 screws on both sides of the fan deck, then remove.
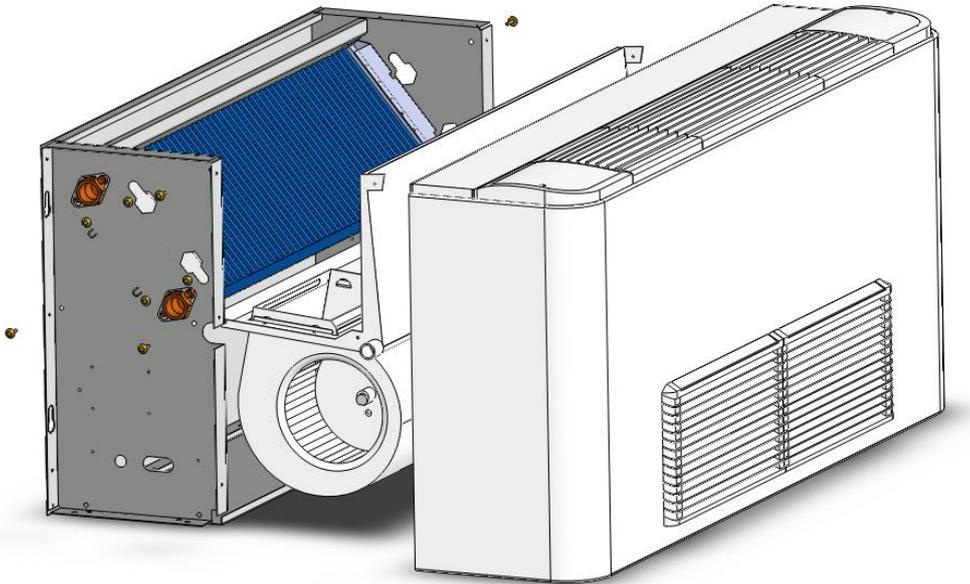
Step 3: Once finished with maintenance put the fan motor assembly back into the casing.

D. Control Specifications: Complete Function PCB – S3 Type Co

Abbreviations

Ts = Setting temperature
Tr = Room air temperature
Ti1 = Chilled water coil temperature
Ti2 = Hot water coil temperature
AUX1 = Hot water free contact
AUX2 = Chilled water free contact
MTV1 = Chilled water valve
MTV2 = Hot water valve

D.1. I/O Port Definitions

I/O		Code	2-Pipe	4-Pipe
Analogue Input	Return air sensor	AI1	Return air temperature (Tr)	
	2-pipe coil circuit sensor	AI2	Chilled / hot water coil circuit (Ti1)	Chilled water coil circuit (Ti1)
	Hot water Sensor	AI3	N/A	Hot water coil circuit (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	Window contacts: for remote ON/OFF (when DIPB SW1=1). Economy mode contacts: for remote activation of economy mode (when DIPB SW1=0).	
	Float switch	Float	Voltage-free (NC)	
	Electrical heater safety switch	EH	Voltage-free (NC). The contact is closed before the EH is turned on.	
Power input	Phase	L1	Power supply: 220V1Ph/60Hz 115V/1Ph/60Hz	
	Neutral	N1		
	Earth	PE1		
Voltage output	Fan 1	CN4	Fan 1 driver	
	Fan2	CN5	Fan 2 driver and motor connection port.	
	Valve1	MTV1	2-pipe coil circuit valve output – chilled / hot water valve. Voltage output (L)	2-pipe coil circuit valve output – chilled water valve. Voltage output (L)
	Valve2	MTV2	Reserved	4-pipe coil circuit valve output – hot water valve. Voltage output (L)
	Water pump	WP	Power supply to condensate pump Voltage output (L)	
	Voltage of electrical heater (Live)	L-EH	Voltage output (L), maximum 30A [See wiring diagram, cross check with supplier].	
	Stepping motor	CN1-2	Power supply to louver stepping motors Voltage output (L)	

I/O		Code	2-Pipe	4-Pipe
Output	Auxiliary contact 2	AUX2	Cooling mode signal relay (NO). Voltage free contact. To ensure the sensitivity of the connection, please make sure max wiring length < 30 m.	
	Auxiliary contact 1	AUX1	Heating mode signal switch (NO). Voltage free contact. To ensure the sensitivity of the connection, please make sure max wiring length < 30 m.	
	Serial BUS port	CN3	Master-slave network serial connection OR MODBUS / local PC host network serial connection.	
	24VAC power input	DA1	24VAC external power supply (modulating valve applications only).	
	Modulating valve output 1	DA2	Connection to DC modulating valve on 2-pipe coil circuit - chilled / hot water.	Connection to DC modulating valve on 4-pipe coil circuit - chilled water.
	Modulating valve output 2	DA3	N/A	Connection to DC modulating valve on 4-pipe coil circuit - hot water.

MDL SOLUTIONS

D.2.   Wiring Diagram
Complete Function PCB – S3 Type Control

DIPA-S1

SW1-5: set the unit address
SW6 :set unit type :master or slave

Mode Configuration
SW7=0;SW8=0; unit operates in cooling/heating
SW7=0;SW8=1; unit operates in cooling/heating w/booster EH
SW7=1;SW8=0 ; unit operates in cooling
SW7=1;SW8=1; unit operates in cooling with primary EH

DIPB-S2

SW1:Occupancy connect setting (see section 2.B.2)
SW2: Unit configuration setting: 0=2pipe system;1=4-pipe system)
SW3:on/off valve configuration:0= no valve 1=with valve (applicable to 2 pipe system only)
SW4:preheat setting:0=36C;1=28C
SW5:Fan1(CN4)configuration setting :0=Fan1 OFF;1=Fan1 ON .
SW6:Fan2(CN5)configuration setting :0=Fan2 OFF;1=Fan1 ON .

L1 \L2----Power supply
VALVE1: on/off valve output
   (2pipe :cooling/heating) ; (4pipe:cooling)
VALVE2:on/off valve output:; (4-pipe only:heating)
WP:condensate pump output
A1:Voltage free contact;ON:unit in heating mode.
A2:Voltage free contact;ON:unit in cooling mode.
PRO:Occupancy contact
CN1~2:Stepping motor output.
CN3:Serial BUS contact
CN4:Fan motor 1 output
CN5:Fan motor 2 output
AI1:Return air temperature sensor(Tr)
AI2:Indoor coil temperature sensor1 (Ti1)
AI3:Indoor coil temoeraturesensor 2 (Ti2)
X-DISI----LED receiver output
DA2-24VAC input for modulating valves.
DA3-modulating valve 1 output(0-10V modulating signal).(2-pipe:Cooling/Heating)(4-pipe:Cooling)
DA3-modulating valve 1 output(0-10V modulating signal).)(4-pipe only:heating)

Unit wiring scheme

TERMINAL

GR GR RD RD WH WH BL BK

PRO PRO A2 A2 A1 A1 GN N L1

KD

Power In

24TR

N1 N2 N3 N4 PE1

PUMP L1

BL / BK — PUMP

V COM
VALVE2
VALVE1

BL / WH / BK — 24v Valve

AUX2
AUX2

BK/2.5 / WH/2.5 — Electrical heater
FUSE

AUX1
AUX1

OR / OR — temperature control switch for electrical heater

electrical heating 30A
L EH

RD / RD — float control switch for pump

DIPA-S1
NO 8~1MS
EH GND3

ONOFF GND2

DIPB-S2
NO 9~1MS
FLOAT GND1

BLDC — CN4
BLDC — CN5

WH OR BR BL RD — EC moter

WH OR BR BL RD — EC moter

CN1
A B A B
X-DISI S3 S4

AI1
AI2
AI3
TTL1
DA2
GND DA2 24V GND DA3
DA3

PROG1

Tr
Ti1
Ti2

NEXT UNIT

LED display/IR receiver

Wired wall pad

24VAC Cooling Modulate valve
AC24V com 10V signal

24VAC Cooling Modulate valve
Or Heating Modulate valve for 2 pipe
AC24V com 10V signal Connect

D.3. Configuration Settings

DIPA-S1

DIPB-S2

SW1-SW5 Network address setting

Master / Slave setting
SW6=1   Master
SW6=0   Slave

SW7/SW8 Operating mode
SW7=0   Cooling and heating modes available
SW8=0

SW7=0   Cooling and heating modes available,
SW8=1   with EH functioning as booster

SW7=1   Cooling mode only available
SW8=0

SW7=1   Cooling and heating modes available,
SW8=1   with EH functioning as primary

SW5/SW6 Fan Qty setting
SW5=0   Single fan application
SW6=1

SW5=1   Twin fans application
SW6=1

Preheat temperature setting
SW4=1   28°C
SW4=0   36°C

230VAC on/off valve setting
SW3=1   With valve
SW3=0   Without valve

2-pipe/4-pipe system configuration
SW2=1   4-pipe system
SW2=0   2-pipe system

PR-O contact setting
SW1=1 Window contact (remote on/off)
When PROs closed for 10 minutes, unit enters standby mode.
When PROs opened, unit resumes operation.
SW1=0 Economy contact
When PROs closed, dead-band condition is increased from "Tr=Ts+/-1" to "Tr=Ts+/-4".

Note: 0 = OFF
            1 = ON

UNIT ON/OFF

There are 3 ways to turn the system on or off:

    a)   By the ON/OFF button on the remote handset or wired wall pad;

    b)   By the programmable timer on the handset or wired wall pad;

    c)   By the manual control button on the air conditioner.

AUTO-RESTART

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

The restored parameter data-set depends on the type of user interface.

    a) Handset only user interface:

        When the power ON signal is received by the air conditioner and no wired wall-pad is installed, the Mode, Fan Speed, Set temperature and Louver/Swing setting will be the same as the handset setting before the last power OFF.

    b) Wall-pad only OR wall-pad and handset user interface:

        When the power ON signal is received by the air conditioner and a wired wall-pad is installed, the Mode, Fan Speed, Set temperature, Louver/Swing setting and Timer ON/OFF weekly program will be the same as the wall pad setting before the last power OFF.

D.4. Control Logics for 2-Pipe System

D.4.1. With Valve Configuration

COOL MODE

a) MTV2, AUX1 and electric heater are always off.

b) If Tr ≥ Ts+1.8ºF (or +7.2 ºF if economy contact is activated), cool operation is activated, MTV1 and AUX2 are turned on. Indoor fan runs at set speed.

c) If Tr < Ts, cool operation is terminated, MTV1 and AUX2 are turned off. Indoor fan runs at set speed.

d) The range of Ts is 61-86ºF

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

f) When turned on, MTV1 requires 30 seconds before it is fully open.

g) When turned off, MTV1 requires 120 seconds before it is fully closed.

h) When the unit is turned off, indoor fan will delay for 5 seconds before it is turned off.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

a) If Ti1 ≤ 35.6 ºF for 2 minutes, MTV1 and AUX2 are turned off. If indoor fan is set for low speed, it will run at medium speed. If it is set at medium or high speed, it will keep running at the same speed.

b) If Ti1 ≥ 41ºF for 2 minutes, MTV1 and AUX2 are turned on. Indoor fun runs at set speed.

FAN MODE

a) Indoor fan runs at the set speed while heater, MTV1, MTV2, AUX1 and AUX2 are turned off.

b) Indoor fan speed can be adjusted for low, medium and high.

HEAT MODE

Heat mode without electrical heater

a) MTV2, AUX2 and electric heater are always off.

b) If Tr ≤ Ts-1.8ºF (or -7.2ºF if economy contact is activated), heat operation is activated, MTV1 and AUX1 are turned on. Indoor fan runs at the set speed.

c) If Tr > Ts, heat operation is terminated, MTV1 and AUX1 are turned off. Indoor fan runs at 200rpm.

d) The range of Ts is 61-86ºF。

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

f) MTV1 will delay for 30 seconds before it is turned on.

g) MTV1 will delay for 120 seconds before it is turned off.

Heat mode with electrical heater as booster

a) MTV2 and AUX2 are always off.

b) If Tr ≤ Ts-1.8ºF (or -7.2ºF if economy contact is activated), heat operation is activated, MTV1 and AUX1 are turned on. Indoor fan runs at the set speed.

c) If Tr > Ts, heat operation is terminated, MTV1 and AUX1 are turned off. Indoor fan runs at 200rpm

d) If Ti1 < 104ºF, the electrical heater is turned on. If 104ºF ≤ Ti1 < 113 ºF, the electrical heater is kept original state. If Ti1 ≥ 113 ºF, the electrical heater is turned off.

e) The range of Ts is 61-86ºF

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

g) MTV1 will delay for 30 seconds before it is turned on.

h) MTV1 will delay for 120 seconds before it is turned off.

Heat mode with electrical heater as primary heat source
a)   MTV1, MTV2, and AUX2 are always off
b)   If Ti2 ≤ 86ºF (or Ti2 is damaged or disconnected), AND if Tr ≤ Ts-1.8ºF (or -7.2ºF if economy contact is activated), heat operation is activated, electrical heater and AUX1 are turned on. Indoor fan runs at set speed.
c)   If Tr > Ts, heat operation is terminated, Electrical heater and AUX 1 are turned off. Indoor fan runs at 200rpm.
d)   The range of Ts is 61~86 ºF
e)   Indoor fan speed can be adjusted for low, medium, high and auto.

Over-heat protection of indoor coil in heat mode
f)   If Ti1 ≥ 167 ºF, MTV1, AUX2 and EH are turned off, indoor fan runs at high speed, even in standby mode.
g)   If Ti1 < 158ºF, unit will keep at original state.
h)   If indoor coil temperature sensor is damaged, the protection mode will be overridden and the Pre-heat and Post-heat set times will be used instead.

PRE-HEAT
Pre-heat without electrical heater
a)   If Ti1 < 97ºF [or < 82ºF is selected by DIPB-S2 position SW4], MTV1 and AUX1 are on, indoor fan runs at 200rpm.
b)   If Ti1 ≥ 100 ºF [or ≥ 86ºF is selected by DIPB-S2 position SW4], MTV1 and AUX1 are on, indoor fan runs at set speed.
c)   If indoor coil temperature sensor is damaged, pre-heat time is set for 2 minutes and indoor fan runs at set speed.

Pre-heat with electrical heater
a)   If indoor fan speed ≥ 300rpm, electrical heater will turn on.

POST-HEAT
Post-heat without electrical heater
a)   If Ti1 ≥ 100ºF, MTV1 and AUX 1 are off, indoor fan continues to run at set speed.
b)   If 96 °F ≤ Ti1 ≤ 100 °F, MTV1 and AUX1 are off. Indoor fan keeps original state.
c)   If Ti1 < 96ºF, MTV1 and AUX1 are off. Indoor fan runs at 200rpm.
d)   If indoor coil temperature sensor is damaged, post-heat time is set for 3 minutes with indoor fan running at set speed.

Post-heat with electrical heater
a)   Indoor fan will run at 200rpm before the unit turns off for 20 seconds.

Over-heat protection of indoor coil in post-heat
a)   If Ti1 ≥ 167ºF, MTV1 and AUX1 are off, indoor fan remains on and runs at high speed.
b)   If Ti1 < 158ºF, MTV1 and AUX1 are on, indoor fan remains on and runs at set speed.
c)   If indoor coil temperature sensor is damaged, the protection mode will become obsolete and the unit will work according to the Pre-heat and Post-heat program.

DEHUMIDIFICATION MODE

a)   MTV2, AUX1 and heater are always off.
b)   If Tr ≥ 77 ºF, MTV1 and AUX2 will be ON for 3 minutes, and OFF for 4 minutes.
c)   If 61 ºF ≤ Tr < 77 ºF, MTV1 and AUX2 will be ON for 3 minutes, and OFF for 6 minutes.
d)   If Tr < 61 ºF, MTV1 and AUX2 will be turned off for 4 minutes.
e)   At the end of the above dehumidification cycle, system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process.

AUTOMODE

Auto cool/heat/heat with electric heater as booster
   a) Every time the unit is turned on, MTV1 is on, AUX1, AUX2 and fan are off. MTV2 and heater are always off.
   b) After 120sec, subsequent operation mode is decided according to following program:
        i. If the coil temperature sensor (Ti1) ≥ 97°F, MTV1, AUX1 and fan turn on or off according to HEAT mode.
        ii. If Ti1 < 97°F, MTV1, AUX2 and fan turn on or off according to COOL mode.
   c) Unit remains in AUTO COOL or AUTO HEAT mode throughout the operating cycle until the user changes the mode manually or restarts the unit.
   d) Should there be failure of Ti1 sensor, auto mode is not allowed.

Auto heat with electric heater as primary heat source / all configuration auto changeover
   a) If current running mode is auto cool mode, the control logic will change over to auto heat mode when all the following conditions are met:
        i. Ts-Tr ≥ 1.8°F (or 7.2 ºF if economy contact is activated)
        ii. MTV1 has stop ≥ 10 min.

   b) If current running mode is auto heat mode, it will change over to auto cool mode when all the following conditions are met:
        a) Tr-Ts ≥ 1.8°F (or 7.2ºF if economy contact is activated)
        b) MTV1 has stop ≥ 10 min.

   Note: Auto cool or auto heat operation are the same as cool or heat mode respectively.

D.4.2. Without Valve Configuration

COOL MODE
a) Electric heater, AUX1, MTV1 and MTV2 are always off.
b) If Tr ≥ Ts+1.8 ºF (or +7.2ºF if economy contact is activated), cool operation is activated, AUX2 is on. Indoor fan runs at set speed.
c) If Tr < Ts, cool operation is terminated, AUX2 is off. Indoor fan is turned off.
d) The range of Ts is 61-86 ºF
e) Indoor fan speed can be adjusted for low, medium, high and auto.

Note: When the unit is turned off, indoor fan will delay for 5 seconds before it is turned off.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

a) If Ti1 ≤ 36 ºF for 2 minutes, AUX2 is off. If low speed is selected via user interface, indoor fan runs at medium speed. If medium or high speed is selected via user interface, indoor fan runs at set speed.
b) If Ti1 ≥ 41 ºF for 2 minutes, AUX2 is on. Indoor fan runs at set speed.

FAN MODE

a) Indoor fan runs at the set speed while heater, AUX1, AUX2, MTV1 and MTV2 are turned off.
b) Indoor fan speed can be adjusted for low, medium and high.

HEAT MODE

Heat mode without electrical heater

a) MTV1, MTV2, AUX2 and heater always off.
b) If Tr ≤ Ts-1.8 ºF (or -7.2 ºF if economy contact is activated), heat operation is activated, AUX1 is turned on. Indoor fan runs at the set speed.
c) If Tr > Ts, heat operation is terminated, AUX1 is turned off. Indoor fan runs at 200rpm.
d) The range of Ts is 61-86 ºF.
e) Indoor fan speed can be adjusted for low, medium, high and auto.

Heat mode with electrical heater as booster

a) MTV1, MTV2 and AUX2 are always off.
b) If Tr ≤ Ts-1.8 ºF (or -7.2 ºF if economy contact is activated), heat operation is activated, AUX1 is turned on. Indoor fan runs at the set speed.
c) If Tr > Ts, heat operation is terminated, AUX1 is turned off. Indoor fan runs at 200 rpm.
d) If Ti1 < 104 ºF, the electrical heater is turned on. If 104 ≤ Ti1 < 113 ºF, the electrical heater is kept original state. If Ti1 ≥ 113 ºF, the electrical heater is turned off.
e) The range of Ts is 61-86 ºF.
f) Indoor fan speed can be adjusted for low, medium, high and auto.

PRE-HEAT

Pre-heat with electrical heater

a) Indoor fan will turn on after the electrical heater is turned on for 10 sec.

POST-HEAT

<u>Post-heat with and without electrical heater</u>

a)   AUX1 is off. Electrical heater is turned off.
b)   Indoor fan will turn off after the unit is turned off for 20sec.

<u>Over heat protection of indoor coil in post-heat</u>

a)   If Ti1 ≥ 167ºF, AUX1 is turned off, indoor fan remains on and runs at high speed.
b)   If Ti1 < 158 ºF, AUX1 is turned on, indoor fan remains and runs at set speed.
c)   If indoor coil temperature sensor is damaged, the protection mode will become obsolete and the unit will work as the Pre-heat and Post-heat program.

DEHUMIDIFICATION MODE

a)   MTV1, MTV2, AUX1 and heater always off.
b)   If Tr ≥ 77 ºF, indoor fan and AUX2 will be ON for 3 minutes, and OFF for 4 minutes.
c)   If 61 ºF ≤ Tr < 77 ºF, indoor fan and AUX2 will be ON for 3 minutes, and OFF for 6 minutes.
d)   If Tr < 61 ºF, indoor fan and AUX2 will be turned off for 4 minutes.
e)   At the end of the above dehumidification cycle, system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process

AUTOMODE
Not available.

D.5. Control Logic For 4-Pipe System

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

COOL MODE

a) MTV2, AUX1 and Electrical Heater always off.
b) If $Tr \geq Ts+1.8$ ºF (or +7.2 ºF if economy contact is activated), cool operation is activated, MTV1 and AUX2 are turned on. Indoor fan runs at set speed.
c) If $Tr < Ts$, cool operation is terminated, MTV1 and AUX2 are turned off. Indoor fan runs at set speed.
d) The range of Ts is 61-86 ºF

e) Indoor fan speed can be adjusted for low, medium, high and auto.
f) When turned on, MTV1 requires 30 seconds before it is fully open.
g) When turned off, MTV1 requires 120 seconds before it is fully closed.
h) When the unit is turned off, indoor fan will delay for 5 seconds before it is turned off.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

a) If $Ti1 \leq 36$ ºF for 2 minutes, MTV1 and AUX2 are turned off. If indoor fan is set for low speed, it will run at medium speed. If it is set at medium or high speed, it will keep running at the same speed.
b) If $Ti1 \geq 41$ ºF for 2 minutes, MTV1 and AUX2 are turned on. Indoor fun runs at set speed.

FAN MODE

a) Indoor fan runs at the set speed while heater, MTV1, MTV2, AUX1 and AUX2 are turned off.
b) Indoor fan speed can be adjusted for low, medium and high.

HEAT MODE

Without Electrical Heater

a) MTV1, AUX2 and heater always off.
b) If $Tr \leq Ts-1.8$ ºF (or -7.2 ºF if economy contact is activated), heat operation is activated, MTV2 and AUX1 are turned on. Indoor fan runs at the set speed.
c) If $Tr > Ts$, heat operation is terminated, MTV2 and AUX1 are turned off. Indoor fan runs at 200rpm.
d) The range of Ts is 61-86 ºF.
e) Indoor fan speed can be adjusted for low, medium, high and auto.
f) MTV2 will delay for 30 seconds before it is turned on.
g) MTV2 will delay for 120 seconds before it is turned off.

With Electrical Heater as Booster

a) MTV1 and AUX2 are always off.
b) If $Tr \leq Ts-1.8$ ºF (or -7.2 ºF if economy contact is activated), heat operation is activated, MTV2 and AUX1 are turned on. Indoor fan runs at the set speed.
c) If $Tr > Ts$, heat operation is terminated, MTV2 and AUX1 are turned off. Indoor fan runs at 200rpm.
d) If $Ti2 < 104$ ºF, the electrical heater is turned on. If 104 ºF $\leq Ti2 < 113$ ºF, the electrical heater is kept original state. If $Ti2 \geq 113$ ºF, the electrical heater is turned off.
e) The range of Ts is 61-86 ºF
f) Indoor fan speed can be adjusted for low, medium, high and auto.
g) MTV2 will delay for 30 seconds before it is turned on.
h) MTV2 will delay for 120 seconds before it is turned off.

PRE-HEAT

Without Electrical Heater

a) If Ti2 < 97 ºF [or 82 ºF depends on DIP setting], when MTV2 and AUX1 are on, indoor fan remains off.
b) If Ti2 ≥ 100 ºF [or 86 ºF depends on DIP setting], when MTV2 and AUX1 are on, indoor fan runs at set speed.
c) If indoor coil temperature sensor is damaged, pre-heat time is set for 2 minutes and indoor fan runs at set speed.

With Electrical Heater

a) If indoor fan speed ≥ 300 rpm, electrical heater is turned on

POST HEAT

Without Electrical Heater

a) If Ti2 ≥ 100 ºF, when MTV2 and AUX 1 are off, indoor fan continues to run at set speed.
b) If 97 °F ≤ Ti2 ≤ 100 °F, when MTV2and AUX1 are off. Indoor fan keeps original state.
c) If Ti2 < 97ºF, MTV2 and AUX1 are off. Indoor fan runs at 200 rpm.
d) If indoor coil temperature coil is damaged, post-heat time is set for 3 minutes with indoor fan running at set speed.

With Electrical Heater

a) Indoor fan will turn off after the unit off for 20 seconds.

OVER HEAT PROTECTION OF INDOOR COIL

a) If Ti2 ≥ 167 ºF, MTV2 and AUX1 are turned off, indoor fan remains on and runs at high speed.
b) If Ti2 < 158 ºF, MTV2 and AUX1 are turned on, indoor fan remains on and runs at set speed.
c) If indoor coil temperature sensor is damaged, the protection mode will become obsolete and the unit will work as the Pre-heat and Post-heat set times.

DEHUMIDIFICATION MODE

a) MTV2, AUX1 and heater always off.
b) If Tr ≥ 77 ºF, MTV1 and AUX2 will be ON for 3 minutes, and OFF for 4 minutes.
c) If 61 ºF ≤ Tr < 77 ºF, MTV1 and AUX2 will be ON for 3 minutes, and OFF for 6 minutes.
d) If Tr < 61 ºF, MTV1 and AUX2 will be turned off for 4 minutes.
e) At the end of the above dehumidification cycle, system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process.

AUTOMODE

a) If current running mode is AUTO COOL mode, it will change over to AUTO HEAT mode upon satisfy all the conditions below:
   i. Ts - Tr ≥ 1.8°F (or -7.2 ºF if economy contact is activated)
   ii. MTV1 has stop ≥ 10 min.

b) If current running mode is AUTO HEAT mode, it will change over to AUTO COOL mode upon satisfy all the conditions below:
   i. Tr - Ts ≥ 1.8°F (or +7.2 ºF if economy contact is activated)
   ii. MTV2 has stop ≥ 10 min.

   Note: AUTO COOL or AUTO HEAT operations are the same as COOL or HEAT mode respectively.

D.6. Sleep Mode

a) The sleep mode can only be set when the unit is in cool mode or heat mode.

b) If the sleep mode is activated when the unit is in cooling, the indoor fan will run at low speed and Ts will increase 2.6 ºF during 2 hours.

c) If the sleep mode is activated when the unit is in heating, the indoor fan will run at set speed and Ts will decrease 3.6 ºF during 2 hours.

d) Changing the mode of operation will cancel the sleep mode.

The cool mode sleep profile is:
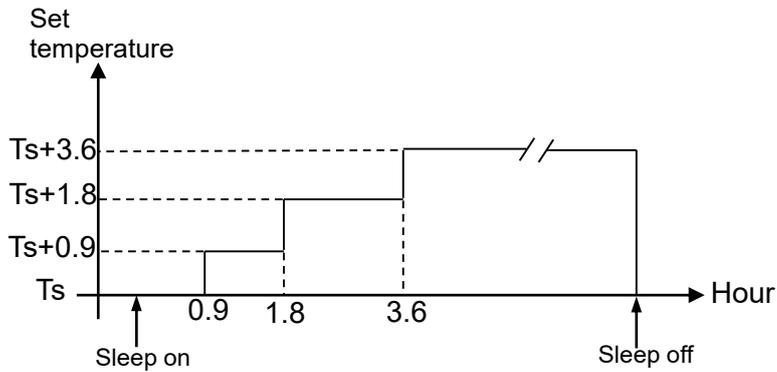
The heat mode sleep profile is:
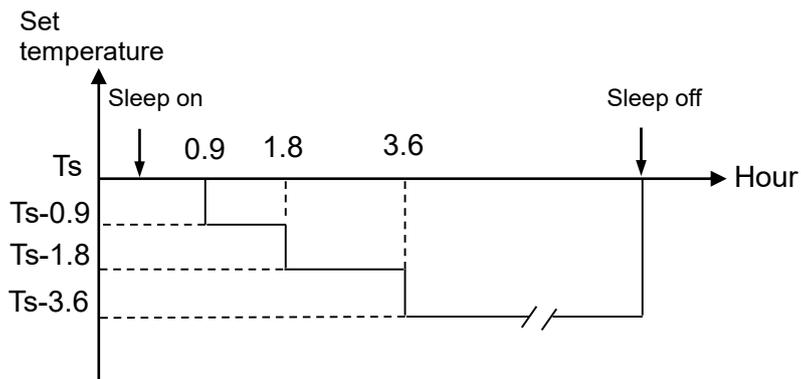
D.7.   Auto Fan Speed

COOL MODE

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

Fan speed is regulated according to the profile below.
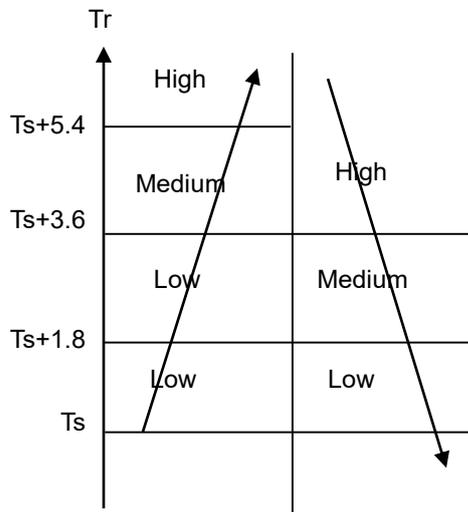
HEAT MODE

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

Fan speed is regulated according to the profile below.
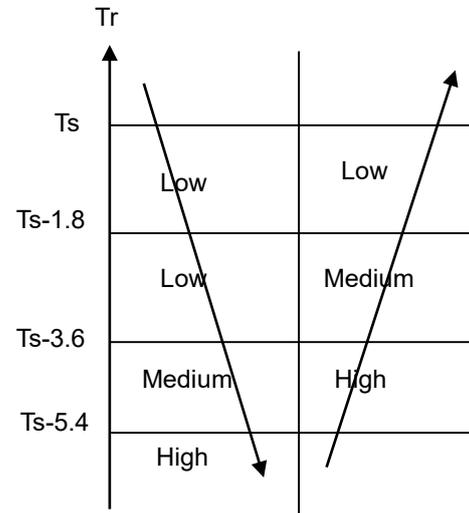
After 30 seconds the fan speed is modulated according to the difference between the room temperature and the set temperature. The controller adjusts the motor signal input from 0 to 5VDC by PID calculation at every 10 seconds interval. The air flow is adjusted from 15% to100%.

D.8.   Modulating Valve Control Under Energy Saving Mode

If the modulating valve is used, the water flow is adjusted from 0 to 100% according to the room temperature and set temperature. The controller adjusts the modulating valve signal input from 0-10VDC by PID calculation every 10 seconds interval.

D.9.   Buzzer

If a command is received by the air conditioner, the master unit will respond with 2 beeps for each setting, and the slave unit will respond with 1 beep.

D.10.   Auto Restart

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

D.11. On/Off Switch On The Front Panel

- This is a tact switch to select Cool→Heat→Off operation mode.
- In COOL mode, the set temperature of the system is 75 ºF with auto fan speed and swing. There are no timer and sleep modes.
- In HEAT mode, the set temperature of the system is 75 ºF with auto fan speed and swing. There are no timer and sleep modes.
- Master unit that does not use wall pad will globally broadcast.

> **NOTE**
>
> *When button pressing is effective, master unit buzzer will beep twice and slave unit beeps once.*

D.12. Drain Pump

- Drain pump turns ON if thermostat cut in during cooling or dehumidification cooling cycle. It remains 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.

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

D.13. Float Switch

Float-switch opens before turning on.

- If float switch (N/C) is opened before the unit is turned on. MTV1 is off. Drain pump and indoor fan will operate. After float switch is closed, MTV1 is on.

Float switch is opened, when unit is on.

- If float switch is opened continuously ≥ 5 seconds, drain pump will work and MTV1 remain off. When the float switch is closed, the drain pump will run for an additional 5 minutes.   If the float switch is opened for 10 minutes continuously, MTV1 will remain off. Indoor fan runs at set speed and system reports 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 an additional 5 minutes. If the float switch is opened for 10 minutes continuously, system reports error.

D.14. Electric Heater Safety Switch

- Before the electrical heater is turned on, the EH safety switch must be closed and motor RPM is more than 300RPM. If this contact is opened for ≥ 1 second or fan RPM is less than 300RPM, heater will be turned off immediately and report error. Once the contact is returned to close position ≥ 60 seconds, reset the error and heater will start again.

- When EH safety switch is opened ≥ 3 times within 60 minutes, heater is not allowed to start anymore. Turn off the unit to reset the fault provided that the switch has returned to closed position.

LED receiver in ABS housing with 0.5m (SGS14HFCA-01010101) or 1.8m (SGS14HFCA-01010102) pre-wiring

Complete Function PCB		
Fan speed setting	LED indication	Condition
High speed	Red LED On	Normal
Medial speed	Yellow LED On	Normal
Low speed	Green LED On	Normal

For all units - Green LED			
Error Description	Blink	Reason	Remedy
Electrical heater failure	Green LED blink 1 times, stop 3 sec	*Only for unit with EH.* EH protection switch is opened.	1. Change fan speed to high. 2. Replace the damaged protection switch of EH.
Indoor coil sensor 2 failure	Green LED blink 2 times, stop 3 sec	Ti2 sensor unplugged or damaged.	1. Check Ti2 plug is connected or not. 2. Check sensor's resistance is correct or not.
Return air sensor failure	Green LED blink 3 times, stop 3 sec	Room sensor unplugged or damaged.	1. Check Tr plug is connected or not. 2. Check sensor's resistance is correct or not.
Indoor coil sensor 1 failure	Green LED blink 4 times, stop 3 sec	Ti1 sensor unplugged or damaged.	1. Check Ti1 plug is connected or not. 2. Check sensor's resistance is correct or not.
Indoor coil low temperature protection	Green LED blink 5 times, stop 3 sec	Water temperature is lower than 37.4 ºF.	Check the water temperature.
Indoor coil over heat protection	Green LED blink 6 times, stop 3 sec	Water temperature is higher than 158 ºF.	Check the water temperature
Water pump failure	Green LED blink 7 times, stop 3 sec	Float switch is opened.	1. Check the condensate water pipe connected or not. 2. Check the pump functioned or not.
EC motor failure(CN4)	Green LED blink 9 times, stop 3 sec	No EC motor feedback	1. Check DIPB-SW5 and SW6 setting. 2. Check the EC motor.
EC motor failure(CN5)	Green LED blink 10 times, stop 3 sec	No EC motor feedback	1. Check DIPB-SW5 and SW6 setting. 2. Check the EC motor.

D.16.   LED indication on Master/Slave connection

For master unit indicating defect status of all slave units. Error message can be found in LED lights on master unit.

Master unit LED		
Unit No.	Blink	Remedy
Unit 2 failure	RED LED blink 2 times, stop 3 sec	Check unit 2 communication plug and fix it
Unit 3 failure	RED LED blink 3 times, stop 3 sec	Check unit 3 communication plug and fix it
Unit 4 failure	RED LED blink 4 times, stop 3 sec	Check unit 4 communication plug and fix it
Unit 5 failure	RED LED blink 5 times, stop 3 sec	Check unit 5 communication plug and fix it
Unit 6 failure	RED LED blink 6 times, stop 3 sec	Check unit 6 communication plug and fix it
Unit 7 failure	RED LED blink 7 times, stop 3 sec	Check unit 7 communication plug and fix it
Unit 8 failure	RED LED blink 8 times, stop 3 sec	Check unit 8 communication plug and fix it
Unit 9 failure	RED LED blink 9 times, stop 3 sec	Check unit 9 communication plug and fix it
Unit 10 failure	RED LED blink 10 times, stop 3 sec	Check unit 10 communication plug and fix it
Unit 11 failure	RED LED blink 11 times, stop 3 sec	Check unit 11 communication plug and fix it
Unit 12 failure	RED LED blink 12 times, stop 3 sec	Check unit 12 communication plug and fix it
Unit 13 failure	RED LED blink 13 times, stop 3 sec	Check unit 13 communication plug and fix it
Unit 14 failure	RED LED blink 14 times, stop 3 sec	Check unit 14 communication plug and fix it
Unit 15 failure	RED LED blink 15 times, stop 3 sec	Check unit 15 communication plug and fix it
Unit 16 failure	RED LED blink 16 times, stop 3 sec	Check unit 16 communication plug and fix it
Unit 17 failure	RED LED blink 17 times, stop 3 sec	Check unit 17 communication plug and fix it
Unit 18 failure	RED LED blink 18 times, stop 3 sec	Check unit 18 communication plug and fix it
Unit 19 failure	RED LED blink 19 times, stop 3 sec	Check unit 19 communication plug and fix it
Unit 20 failure	RED LED blink 20 times, stop 3 sec	Check unit 20 communication plug and fix it
Unit 21 failure	RED LED blink 21 times, stop 3 sec	Check unit 21 communication plug and fix it
Unit 22 failure	RED LED blink 22 times, stop 3 sec	Check unit 22 communication plug and fix it
Unit 23 failure	RED LED blink 23 times, stop 3 sec	Check unit 23 communication plug and fix it
Unit 24 failure	RED LED blink 24 times, stop 3 sec	Check unit 24 communication plug and fix it
Unit 25 failure	RED LED blink 25 times, stop 3 sec	Check unit 25 communication plug and fix it
Unit 26 failure	RED LED blink 26 times, stop 3 sec	Check unit 26 communication plug and fix it
Unit 27 failure	RED LED blink 27 times, stop 3 sec	Check unit 27 communication plug and fix it
Unit 28 failure	RED LED blink 28 times, stop 3 sec	Check unit 28 communication plug and fix it
Unit 29 failure	RED LED blink 29 times, stop 3 sec	Check unit 29 communication plug and fix it
Unit 30 failure	RED LED blink 30 times, stop 3 sec	Check unit 30 communication plug and fix it
Unit 31 failure	RED LED blink 31 times, stop 3 sec	Check unit 31 communication plug and fix it
Unit 32 failure	RED LED blink 32 times, stop 3 sec	Check unit 32 communication plug and fix it

E. Networking System

E.1. Master – Slave Network

The control PCB can be set either as a master unit or slave unit.

MASTER UNIT FUNCTION

a) The master unit sends data regarding its setting to the slave unit.
b) The master unit settings are Unit ON/OFF, Mode, Fan Speed, Timer, Clock, Set Temperature, Swing Function, and Sleep Function for handset operation.
c) The master unit settings are Unit ON/OFF, Mode, Fan Speed, Timer, Clock, Set Temperature, Swing Function, and Sleep Function for wall pad operation.

SLAVE UNIT FUNCTION

a) The slave unit receives data regarding its settings from the master unit.
b) The slave unit is allowed to change to a locally desired setting by local controller as long as there are no subsequent changes to the settings of the master unit.
c) The slave units can be set individually for timer ON/OFF function by handset or wall pad. The handset cannot override the wall pad timer and clock setting.

E.1.1.   Master – Slave Network Setup

a) Disconnect the communication plug from the control box
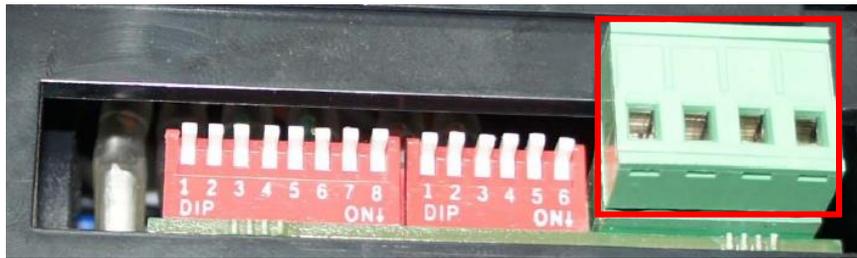
b) Communication plug

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.

c) Connection wire

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

   ii.   Complete wire connection

| First unit | Middle unit | Last unit |

| First unit | Middle unit | Last unit |
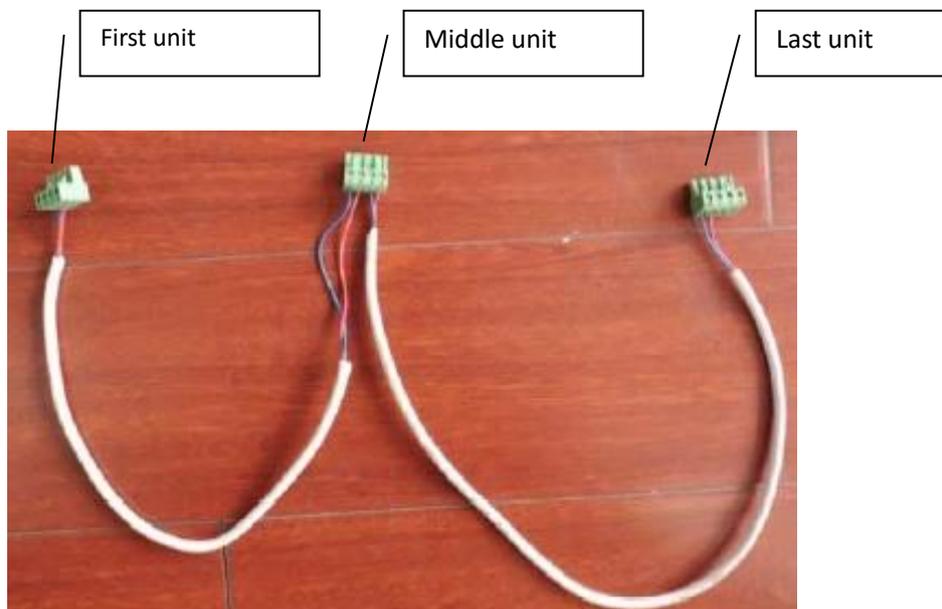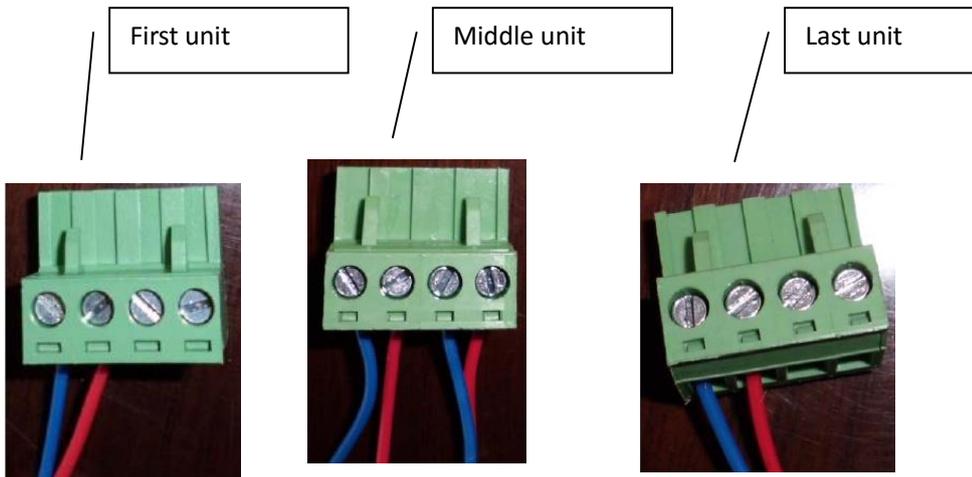
iii. Wire connection check

1) After the wire connection is completed, please check the wire colours correspond.
2) Check the wire contact by using a multimeter.

| 1st contact | 2nd contact | 4th contact | 6th contact |
| 3rd contact | | 5th contact | |
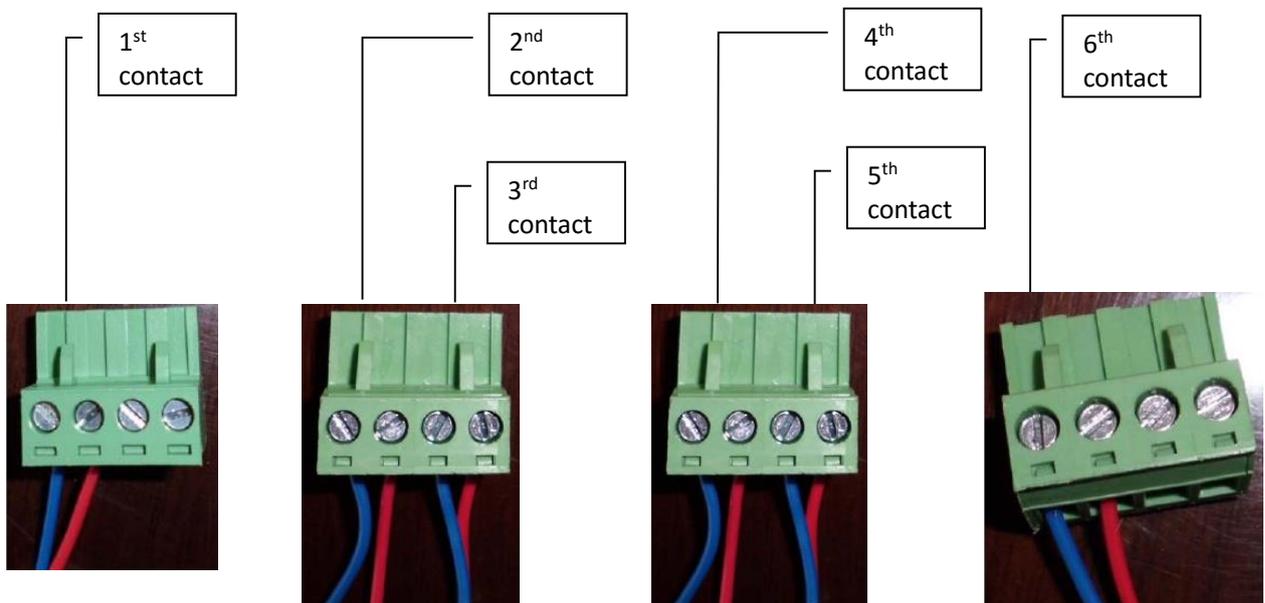
3) Check 1 and 2, 3 and 4, 5 and 6 to be sure the connections are correct.
4) If the resistance between two wire contacts is too high, please check and reconnect the wire contacts.

d) Reconnect the communication plug to the control box

Using Remote Control Handset to Set Master Control Unit:

a) Connect all the units PCBs according to the wire color and type of connector.
b) Select the master unit by setting DIPA-S1 SW6 to ON (=1) in the PCB.
c) Ensure the DIPA-S1 SW6 is set to OFF (=0) in the PCB on each slave unit.
d) Switch on the units by connecting the main power supply.
e) Using the handset set the operation parameters for the Master unit which will automatically send the settings to the slave unit.
f) Master unit will beep twice confirming receipt of commands while the Slave unit will beep once.

Using Wall pad to Set Master Control Unit:

a) Connect all the units PCBs according to the wire color and type of connector.
b) Select the master unit by setting DIPA-S1 SW6 to ON (=1) in the PCB.
c) Ensure the DIPA-S1 SW6 is set to OFF (=0) in the PCB on each slave unit.
d) Provide each slave unit with an addressable code by configuring SW1 – SW5 of DIPA-S1 according to the DIP switch setting table.
e) Switch on the units by connecting the main power supply.
f) Using the wall pad set the operation parameters for the Master unit which will send the setting to the slave units by Global-control communication or Addressable communication methods.
g) Master unit will beep twice confirming receipt of commands while the Slave unit will beep once.

MASTER-SLAVE CONTROL

The control PCB can receive data from both wireless LCD handset and wired wall pad.

E.1.2. Master – Slave Communication Method

There are two modes for the Master-slave structure.

Global Control communication
The Master unit will broadcast the settings to all slave units. During normal operation, slave units can receive commands from its local wireless handset and wall pad control panel. Upon receiving the master global commands, all slave unit settings will be replaced by the master settings.

Addressable communication
The Master controller must be the LCD wall pad. Slave unit parameters are set as usual. Upon receiving the control commands from the Master unit, the addressed slave unit settings will be replaced by the master settings.

DIPA-S1 address setting: ON=1, OFF=0.

DIPA-S1 SW6	DIPA-S1 SW5	DIPA-S1 SW4	DIPA-S1 SW3	DIPA-S1 SW2	DIPA-S1 SW1	Unit No.	Remark
1	0	0	0	0	0	01	Master
0	0	0	0	0	1	02	Slave
0	0	0	0	1	0	03	Slave
0	0	0	0	1	1	04	Slave
0	0	0	1	0	0	05	Slave
0	0	0	1	0	1	06	Slave
0	0	0	1	1	0	07	Slave
0	0	0	1	1	1	08	Slave
0	0	1	0	0	0	09	Slave
0	0	1	0	0	1	10	Slave
0	0	1	0	1	0	11	Slave
0	0	1	0	1	1	12	Slave
0	0	1	1	0	0	13	Slave
0	0	1	1	0	1	14	Slave
0	0	1	1	1	0	15	Slave
0	0	1	1	1	1	16	Slave
0	1	0	0	0	0	17	Slave
0	1	0	0	0	1	18	Slave
0	1	0	0	1	0	19	Slave
0	1	0	0	1	1	20	Slave
0	1	0	1	0	0	21	Slave
0	1	0	1	0	1	22	Slave
0	1	0	1	1	0	23	Slave
0	1	0	1	1	1	24	Slave
0	1	1	0	0	0	25	Slave
0	1	1	0	0	1	26	Slave
0	1	1	0	1	0	27	Slave
0	1	1	0	1	1	28	Slave
0	1	1	1	0	0	29	Slave
0	1	1	1	0	1	30	Slave
0	1	1	1	1	0	31	Slave
0	1	1	1	1	1	32	Slave

If the Master unit is equipped with a wireless handset only, it can only use the Global-Control communication method. If it is equipped with a wall pad, it can use both communication methods.

Open Modbus protocol

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

The communications require a delay of 80ms between reading an answer and sending the next command. All temperatures are equal to reading data*10 accuracy: 1 degree F.

Supported Functions:

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

Valid Error code table:

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

Coils table:

Description	Address	Type*	Remark
Unit ON/OFF	100000	R/W	
Sleep mode	100001	R/W	
Louver swing	100002	R/W	
Reserved	100003		
Reserved	100004		
Reserved	100005		
Reserved	100006		
Reserved	100007		
Reserved	100008		
Reserved	100009		
Reserved	100010		
Reserved	100011		
Reserved	100012		
Reserved	100013		
Reserved	100014		
Reserved	100015		

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

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	
PRO	200007	R	
Float switch	200008	R	
Reserved	200009	R	
EH safety switch	200010	R	
Unit ON/OFF status	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) Position 2 = 02(H) Position 3 = 03(H) Position 4 = 04(H) Auto = 0F(H) Stop = 00(H)
Setting temperature	300003	R/W	60.8~86 degree F (actual*10 format)
Address setting	300004	R	Set by dip-switch, reading only
Reset	300005	W	=0x33 reset error
Week	300006	W	Calibration wired wall pad and set timer function
Hour	300007	W	Calibration wired wall pad and set timer function
Minute	300008	W	Calibration wired wall pad and set timer function
Second	300009	W	Calibration wired wall pad and set timer function
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
Super low speed rpm	310000	R/W	200~1500
Low speed rpm	310001	R/W	200~1500
Medium speed rpm	310002	R/W	200~1500
High speed rpm	310003	R/W	200~1500
RPM setting	310004	R/W	0~2000 (used to test，0 = disable)
Temperature sampling time	310005	R/W	2~100, default:5S
Factor of auto fan speed	310006	R/W	2~150, default:20
Factor of modulating valve	310007	R/W	2~250, default:150

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

Input Register table:

Description	Address	Type*	Remark
Dip switch 1 status	400000	R	
Dip switch 2 status	400001	R	
Room temperature sensor	400002	R	
Ti1 temperature sensor	400003	R	
Ti2 temperature sensor	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 = Reserved Bit7 = Electrical heater failure Bit8 = Motor1 Error Bit9 = Motor2 Error Bit10 = System parameters error Bit11 = Reserved Bit12 = Reserved Bit13 = Reserved Bit14 = Reserved Bit15 = Reserved
Fan speed status	400006	R	Low = 04(H) Medium = 02(H) High = 01(H)
Mode status	400007	R	Cooling mode = 01(H) Dehumidify mode = 02(H) Fan mode = 04(H) Heating = 08(H)
Setting temperature status	400008	R	Testing only
Room temperature in wall pad status	400009	R	
Room temperature in main PCB status	400010	R	
Unit type	400011	R	4-pipe = 03, 2-pipe = 02 This setting is configured by dip switch
EC motor 1# RPM	400012	R	
EC motor 2# RPM	400013	R	

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

Remark:
The above protocol address is in Base 0.

F. Control Specifications: Flexible Function PCB – W3 Control

Used in all PFWB(C) [V/P] **W** unit configurations.

F.1. Features

a) Condensate management with valve protection and NC alarm contact.
b) Integrated fan relays for zone control applications.
c) ON/OFF thermostat input and low-voltage modulating fan speed input flexibility.
d) Simple error diagnostic and LED error display.

F.2. I/O Port Definitions

I/O		Code	2-Pipe	4-Pipe
Analogue input	Coil temperature sensor	AI1	Cooling / heating coil sensor (Ti1)	Cooling only coil sensor (Ti1)
Voltage input	High fan speed	H	24VAC input signals from wired thermostat	
	Medium fan speed	M		
	Low fan speed	L		
	Phase	L	220V/1Ph/60Hz 115V/1Ph/60Hz.	
	Neutral	N		
	Earth	GND		
	Auto ON/OFF	AUTO	24VAC input signal from wired thermostat, activates modulating control mode	
Signal Input	Modulating signal	+/-	Low voltage modulating signal input (standard 0~5VDC; optional 0~10VDC)	
Digital input	Programming interface	TTL	Low voltage digital signal input for board programming	
	Float switch	Float	Voltage-free (NC)	
Voltage output	Water pump	WP	Voltage output (L)	
	EC motor	CN4	5-wire connection with 230 or 115VAC power supply to EC motor and 0-5VDC modulating signal output	
	Stepping motor	CN1-2	Low-voltage output	
Digital output	LED display	X-DIS	Low-voltage output	
Voltage-free output	Alarm		Voltage-free alarm contact: (a) Standard configuration is (NC).	

F.3.   **Onboard configuration**

The PCB can be configured for different modulating signal inputs.

Refer to jumper configuration table below.

Code	State	Description
S1	Open	PCB configured for 0~5VDC modulating signal input.
S1	Closed	PCB configured for 0~10VDC modulating signal input.
S3	N/A	Reserved
S4	N/A	Reserved

MDL
SOLUTIONS

Unit wiring scheme

AEC-W3.1

(Optional) 0-0VDC motor control signal

SWITCH

TERMINAL

BK — L1
BL — N
GY — Y1 — Cooling valve signal
WH — W1 — heater signal
OR — G0 — Low speed signal
BR — G1 — Med speed signal
YL — G2 — Max speed signal
BL — C — 24VAC common
BL — R — 24VAC

Wring connections to thermastat

24VAC signal input

AI1:Indoor coil sensor(TI1)
AI2：0~10VDC ,EC Motor control signal.
X-DIS:Led display
TTL:Wired wallpad,change the motor rpm.

Legent:
S3:short , EC motor output control by CN1.
S4:short, EC motor out put control by cn2

Legent:
ALARM:Pump failure ,it's opened.
PUMP:Water pump output
CN1,CN2:EC motor output

SK2016 PFWBC-V/P-AECM-001

F.4.2. Zone Control Wiring Diagram 1 (ON/OFF thermostat)

EXTENAL POWER
SUPPLY
230VAC-1PH-5-/60HZ

TO
NEXT
FAN
COIL
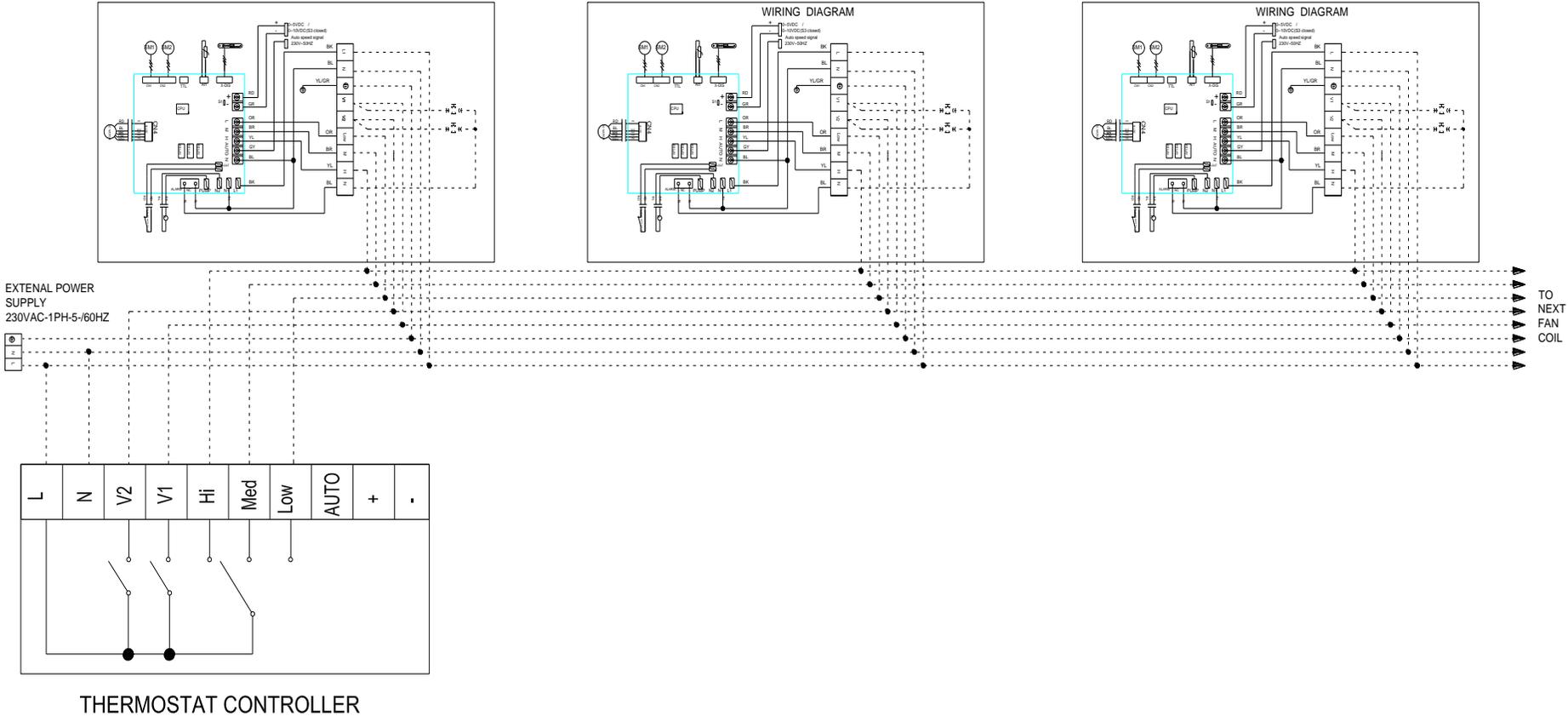
THERMOSTAT CONTROLLER

2-pipe FCU with EC-flexi PCB + EC thermostat + Modulating Valve
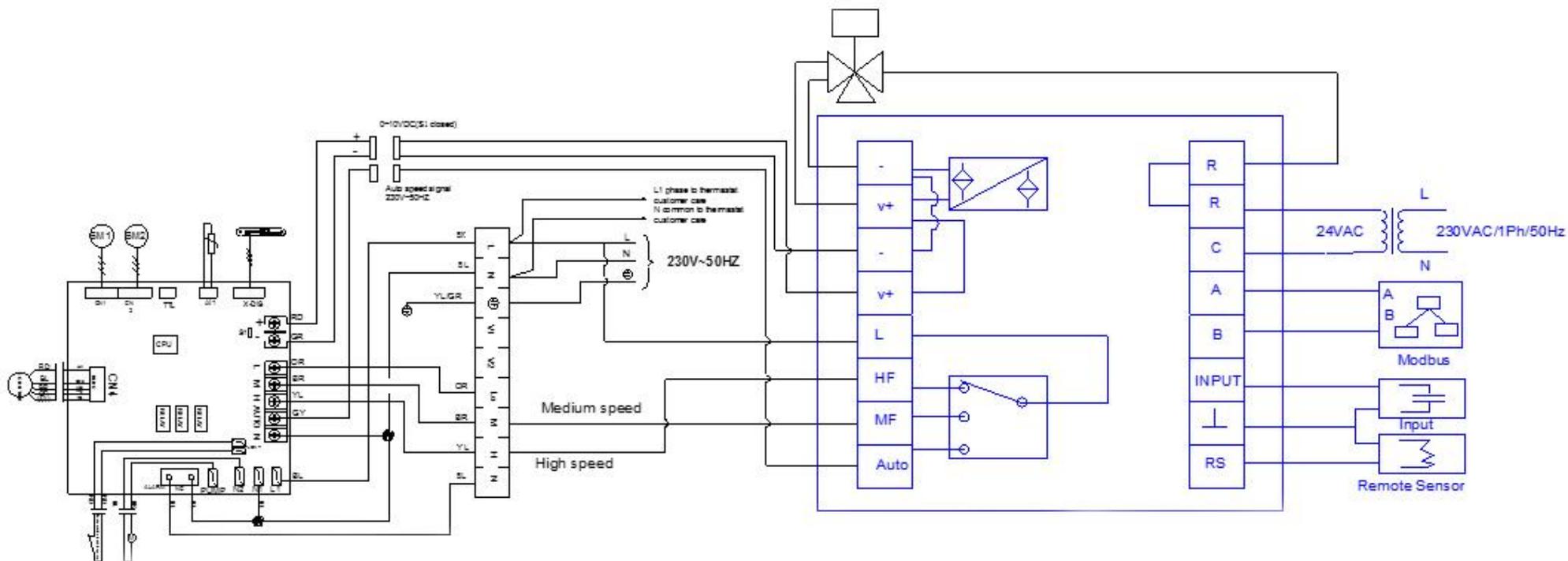
2 – pipe fan coil unit with EC flexi PCB for W Control Type

2 – pipe thermostat ECO STCD 003 (SGS14HFCA-27000303)

F.5. Control Logics Specification

F.5.1. Unit Power ON/OFF

    i. The unit is turned ON when any of the fan speed inputs (H/M/L) are ON, OR Auto ON/OFF signal input is ON.

    ii. The unit is turned OFF only if all of the fan speed inputs (H/M/L) are OFF AND Auto ON/OFF signal input is OFF.

F.5.2. Alarm Protection and Error Display

    i. If the float switch is open for 5 minutes, then the (NC) voltage-free alarm contact shall be open and the (NO) voltage free alarm contact shall be closed.

    ii. If the float switch is open for 10 minutes, the LED display reports a condensate management failure (see table on the next page).

F.5.3. Drain-Pump Run Management

    i. When the unit turns ON:
        a. If Ti1 < 59 ºF, the drain pump turns ON.
        b. If Ti1 ≥ 59 ºF, the drain pump turns OFF.

    ii. When the unit turns OFF and the drain pump is ON:
The drain pump will remain ON for 5 minutes and then turn OFF.

    iii. At any time:
        a. If the float switch is OPEN, the drain pump will turn ON.
        b. If the float switch is OPEN and then CLOSES, the drain pump will remain ON for 5 minutes, and then turn OFF.

F.5.4. Modulating Signal Input

    i. When the "Auto ON/OFF" 230VAC input is ON, the fan motor rpm speed shall be modulated by the "+/-" low voltage modulating signal input.

    ii. The standard configuration is for 0~5VDC modulating signal input.

    iii. The optional configuration is for 0~10VDC modulating signal. To set the PCB to the optional configuration, the S1 jumper must be closed.

LED receiver in ABS housing with 0.5m *(SGS14HFCA-01010101)* **or 1.8m** *(SGS14HFCA-01010102)* **pre-wiring**

Flexible Function PCB – W Control Type		
Fan speed setting	LED Display	Condition
High speed	Red LED On	Normal
Medium speed	Yellow LED On	Normal
Low speed	Green LED On	Normal

For all units - Green LED			
Error Description	Blink	Reason	Remedy
Indoor coil sensor 1 failure	Green LED blinks 4 times, stops for 3s	Ti1 sensor connection is not good or damaged.	1) Check if Ti1 plug is connected or not. 2) Check sensor's resistor is good or not.
Water pump failure	Green LED blinks 7 times, stops for 3s	Float switch is opened.	1) Check if the condensate water pipe is connected or not. 2) Check if the pump is functioning or not.
EC motor failure	Green LED blinks 9 times, stops for 3s	No EC motor feedback	1) Check DIPB-SW5 and SW6 setting. 2) Check the EC motor

G. User Interface

G.1. Remote Handset

Adjust Set Temperature
Press down or up button to decrease or increase the desired room temperature.
Note: Temperature can not be set in Fan mode.

Mode
Press this button to advance the mode in the following sequence:
Cool → Dry → Fan → Heat → Auto Cool-Heat
[Both Cool and Heat symbol light up]

Fan
Press this button to advance the fan speed as follows:
Auto → Low → Medium → High

Under Fan mode, only low, medium and high are available.
Under Dry mode, fan speed will be inhibited and will not be displayed.

On Timer
First press shows the last timer setting. Subsequent pressing will change the timer setting in 1 minute intervals. Hold down the On button continuously to increase the updating speed.

Cancel Timer
Press this button to cancel all timer settings.

Sleep
Press to activate the energy saving Sleep function which automatically adjusts the temperature to provide a more comfortable sleep, ie for use in bedrooms.

On/Off
Press to switch on or off the air conditioner.

Louver
Press this button to change louver angle to a fixed position 1,2,3,4, auto sweep or stop.

Swing
It is not available.

Clock
Press down or up button for 2 seconds to activate. The current clock setting will decrease or increase at 1 minute intervals on each press.
The speed of interval updating increases after 4 seconds of continuous key press. It will update at high speed after 6 seconds of continuous key press.

Off Timer
First press shows the last timer setting. Subsequent pressing will change the timer setting in 1 minute intervals. Hold down the Off button continuously to increase the updating speed.

FAN MODE

TIMER FUNCTION
ON CANCEL OFF

SLEEP LOUVER

SWING

Cool Dry Fan Heat Signal

Set Temperature

Clock

Fan Speed

Sleep

Louver

Timer On/Off

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" function is not applicable.
European version only uses degree C setting.

G.2. Wired Wall Pad

Temperature display area
Display set or room temperature

Operation display

Fan speed display

AUTO Auto fan — Medium
— Low — High

Day display area
Display day of week
SUN Sunday MON Monday TUE Tuesday
WED Wednesday THU Thursday FRI Friday
SAT Saturday

Infra red reception
To receive wireless handset signal

Key lock

Timer display area
Display on/off timer or real time clock, RTC

ON On timer

Global control by master in networking mode

OFF Off timer

Day button
To select day of week, Sunday to Saturday
Or used in weekly on/off timer
programming to select day of week

Net button for networking control

Time setting button
To adjust the RTC setting or to be used in
timer On/Off programming to adjust timer setting

Timer cancel button
To cancel on/off timer setting in
timer programming mode

Unit display area
Display Unit address

ERR Error display
UNIT Address display

On/Off button
Press once to start operation
Press again to stop operation

Room temperature setting button

Parameter + and - buttons to browse various parameters

Swing and Fresh buttons for global control mode setting

Sleep button
Press once to select sleep mode
Press again to cancel sleep mode

Fan speed button
Press to select low,
medium or high speed

Mode button
Press to select cool,
fan, dry, heat or auto
cool-heat operation mode
(for 4-pipe system only)

Timer button
Press to activate on/off
timer programming mode

Display symbols: COOL FAN DRY HEAT AUTO SLEEP SWING
SUN MON TUE WED THU FRI SAT HEATER
AUTO ON OFF ERR UNIT
IR

Buttons: DAY, TIME, NET, + / −, TIMER, CANCEL, MODE, SLEEP, FAN, PARAMETER, + / −, SWING, FRESH

Attention
- Wall pad will recognize the main board model automatically whether it is 2-pipe or 4-pipe system.
- Auto Cool-Heat operation is applicable in 4-pipe system only.
- When the wall pad is installed, the wall-pad temperature sensor automatically overrides the default return air sensor (attached to unit return air grille).

European version only uses degree C setting.

G.2.1. Wall Pad Operation Guidelines

a) Clock display and setting

System has an accurate, internal, real time clock used for time indication and timer ON/OFF function. Clock display area indicates internal time clock which can be set by the $\overset{TIME}{\triangledown}$ or $\overset{+}{TIME}$ buttons.

b) Day display and setting

The wall pad has a day display function which is used for day indication and timer ON/OFF function. Day display icon indicates current day. Press $\overset{DAY}{\frown}$ button to set day.

c) Timer ON/OFF setting

If the master unit is in global control mode and the ON/OFF timer setting is selected, the master unit will command the whole network to be ON or OFF. Otherwise the ON/OFF timer affects the local unit only. The system supports ON/OFF timer settings for each day of the week.

- Press $\overset{TIMER}{\frown}$ button once, 🕐 and **ON** symbol blinking indicates ON timer programming mode. The day display area indicates which day the timer is being set for. If there is no preset ON timer for this day, the timer display area shows ⌒ ° ⌒ ⌒, otherwise the previous timer setting will be shown. Press $\overset{TIME}{\triangledown}$ or $\overset{+}{TIME}$ buttons to change the ON timer setting. Press $\overset{CANCEL}{\frown}$ key to cancel the current ON timer setting and the timer display area will show ⌒ ° ⌒ ⌒. Press $\overset{DAY}{\frown}$ button to change the day the ON timer is to be programmed for.
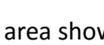
- Press $\overset{TIMER}{\frown}$ button again. 🕐 and **OFF** symbol blinking indicates OFF timer programming mode. The setting method is the same as the ON timer setting above.

- Press $\overset{TIMER}{\frown}$ button again to exit the ON/OFF timer setting function.

- Should there be any ON or OFF timer settings programmed, 🕐 will light up. Should there be any unexecuted ON or OFF timer settings for the current day, its corresponding **ON** or **OFF** icon will light up.

- Hold down $\overset{CANCEL}{\frown}$ button for 3 seconds to cancel all timer settings.

d) Timer set by master unit is as follows:

- Press $\overset{NET}{\frown}$ button to enter into networking control mode. Unit area blinking indicates the slave unit under control. Press $\overset{+}{TIME}$ or $\overset{TIME}{\triangledown}$ to select the desired slave unit. Units that are off will be skipped automatically.

- Press $\overset{TIMER}{\frown}$ button once to enter into ON timer programming mode. Press $\overset{DAY}{\frown}$ button to select the required day of the week. Master unit will then retrieve the setting from the selected slave unit and the timer display area will show "read". The ON timer setting will be shown upon reading the data successfully. Press $\overset{TIME}{\triangledown}$ or $\overset{+}{TIME}$ button to change the ON timer setting of the slave unit.

- Press $\overset{TIMER}{\frown}$ button again to enter into OFF timer programming mode. Press $\overset{DAY}{\frown}$ button to select the required day of the week. Master unit will then retrieve the setting from the selected slave unit and the

timer display area will show "read". The OFF timer setting will be shown upon read successfully. Press $\overset{\text{TIME}}{\triangledown}$ or $\underset{\text{TIME}}{\textcircled{+}}$ button to change the OFF timer setting of the slave unit.

- Upon completion of changing timer settings for the selected day, press $\textcircled{\text{TIMER}}$ button again to exit timer programming mode. The settings will then upload to the selected slave unit. The next day of the week's settings can be done only upon completion of sending data to the slave units. (Repeat steps 1~4 if setting is required for the next day of the week).

- In Global control mode:

  i. Pressing the master unit's $\textcircled{\text{CANCEL}}$ button for 3 seconds will cancel all timer settings in all slave units.
  ii. Timer settings will be broadcast to all slave units.

e) Clock synchronization by master unit is as follows:

Press $\overset{\text{TIME}}{\triangledown}$ and $\underset{\text{TIME}}{\textcircled{+}}$ buttons for 3 seconds to activate clock synchronization in all slave units. Master wall pad will respond with a beeping sound.

f) Key lock

In order to prevent unauthorized access to the system setting, a key lock function is provided. Hold down $\boxed{-}$ and $\boxed{+}$ for 3 seconds to activate key lock. $\multimap$ symbol will light up. Repeat the same to exit key lock. Only $\boxed{\psi}$ button is applicable in key lock mode.

g) Swing

Press $\textcircled{\text{SWING}}$ button to activate or deactivate swing function.

h) Sleep

Press $\textcircled{\text{SLEEP}}$ button to activate or deactivate sleep setting. The sleep function is valid in cool or heat modes only.

i) Temperature setting

Press $\boxed{-}$ or $\boxed{+}$ to enter into temperature setting mode. The temperature display area blinks indicating the current set temperature. Press the above buttons to adjust the set temperature.

j) Mode setting

Press $\textcircled{\text{MODE}}$ button to change the operation mode.

k) Fan speed setting

Press $\textcircled{\text{FAN}}$ button to change the fan speed. Only low speed is available for dehumidification mode.

l) On/Off control

Press $\boxed{\psi}$ to start or stop the air conditioner.

m) Networking Master - Slave Control (only master unit wall pad can control other units on th

Press (NET) button to enter into networking control mode. Unit's display area blinking indicates the slave unit under control. Press (+) TIME or (−) TIME to select the desired slave unit; Units that are off will be bypassed automatically. Parameters that can be controlled are on/off, timer weekly program, set temperature, mode, fan speed, swing and sleep. Parameter operation methods are the same as above. Press (NET) button again to exit networking control mode.

Hold down (SWING) and (FRESH) buttons for 3 seconds to enter into global control mode. ↻ will light up. Repeat the same to exit global control mode. In global control mode, the settings of the master unit will be broadcast to all the slave units.

n) Unit operation parameters browsing

Hold down (CANCEL) and (FAN) buttons for 3 seconds to enter into operation parameters browsing mode. Unit display area shows the address of the slave unit being viewed. Slave unit selection method is the same as in networking control above. Press (+) PARAMETER or (−) PARAMETER to browse various parameters as follow:

Wall pad display temperature area	Wall pad display time area
C0	Return air temperature displayed
C1	Indoor coil temperature displayed
C2	DIP switch setting displayed
C3	Indoor coil 2 temperature

Press (CANCEL) button to exit.

o) Error indication

When a faulty slave unit is detected, the master unit's display area shows the faulty unit address, the time area shows the error code and the wall pad backlight changes to the color red. Should there be multiple units having problems, addresses and error codes will be shown one after another.

Error code definition:

Error	Error code
Electrical heater faulty	E1
Indoor coil sensor 2 faulty	E2
Return air sensor faulty	E3
Indoor coil sensor 1 faulty	E4
Indoor coil low temperature protection	E5
Indoor coil over heat protection	E6
Float switch alarm	E7
Local communication error	E8

G.2.2. EC unit RPM setting

a) Turn OFF the unit.
b) Open wall pad's back cover, where two DIP switches can be seen.
c) Turn the DIP switch 1 to "ON" position.

d) Wired wall pad LED will display the following;

This is the speed level setting.
d0: Low speed
d1: Medium speed
d2: High speed
Press PARAMETER + / - button to select speed level.

This is the motor RPM setting.
Press TEMP. + / - button to increase the RPM setting by 10RPM step.

e) To complete the RPM setting, turn the DIP switch 1 to "OFF" position. The wired wall pad will resume its normal operation.

H. Sensor Resistance R-T Conversion Table

Resistance : R (77°F) = 10KΩ ± 1%

Beta Constant :   B (77/185) = 3977 ± 1%

T	Rmin	Rnom	Rmax	T	Rmin	Rnom	Rmax
(°F)	(KΩ)	(KΩ)	(KΩ)	(°F)	(KΩ)	(KΩ)	(KΩ)
-22	174	182.7	191.8	39.2	26.11	26.9	27.71
-20.2	163.4	171.5	179.9	41	24.85	25.59	26.34
-18.4	153.6	161.1	168.9	42.8	23.65	24.35	25.05
-16.6	144.4	151.3	158.5	44.6	22.52	23.17	23.83
-14.8	135.8	142.2	148.9	46.4	21.45	22.06	22.68
-13	127.8	133.8	140	48.2	20.44	21.01	21.59
-11.2	120.3	125.8	131.6	50	19.48	20.02	20.55
-9.4	113.3	118.4	123.8	51.8	18.58	19.7	19.58
-7.6	106.7	111.5	116.5	53.6	17.71	18.18	18.65
-5.8	100.6	105.1	109.7	55.4	16.9	17.33	17.77
-4	94.9	99.03	103.3	57.2	16.12	16.53	16.94
-2.2	89.51	93.39	97.41	59	15.39	15.77	16.16
-0.4	84.5	88.11	91.85	60.8	14.69	15.05	15.41
1.4	79.8	83.17	86.64	62.6	14.03	14.37	14.7
3.2	75.39	78.53	81.76	64.4	13.41	13.72	14.03
5	71.26	74.18	77.19	66.2	12.81	13.1	13.4
6.8	67.37	70.1	72.9	68	12.24	12.52	12.79
8.6	63.73	66.26	68.88	69.8	11.7	11.96	12.22
10.4	60.3	62.67	65.1	71.6	11.19	11.43	11.67
12.2	57.08	59.28	61.55	73.4	10.71	10.93	11.15
14	54.05	56.1	58.22	75.2	10.24	10.45	10.66
15.8	51.19	53.12	55.08	77	9.8	10	10.2
17.6	48.51	50.3	52.14	78.8	9.374	9.57	9.765
19.4	45.98	47.66	49.37	80.6	8.969	9.16	9.351
21.2	43.61	45.17	46.77	82.4	8.584	8.77	8.957
23	41.36	42.82	44.31	84.2	8.218	8.4	8.582
24.8	39.25	40.61	42	86	7.869	8.047	8.225
26.6	37.26	38.53	39.83	87.8	7.537	7.71	7.885
28.4	35.38	36.56	37.78	89.6	7.221	7.39	7.56
30.2	33.6	34.71	35.85	91.4	6.92	7.085	7.251
32	31.93	32.97	3402	93.2	6.633	6.794	6.956
33.8	30.35	31.32	32.3	95	6.36	6.517	6.675
35.6	28.85	29.76	30.68	96.8	6.099	6.252	6.407
37.4	27.44	28.29	29.15	98.6	5.85	6	6.151

Resistance :   R (77°F) = 10KΩ ± 1%

Beta Constant :   B (77/185) = 3977 ± 1%

T	Rmin	Rnom	Rmax	T	Rmin	Rnom	Rmax
(°F)	(KΩ)	(KΩ)	(KΩ)	(°F)	(KΩ)	(KΩ)	(KΩ)
100.4	5.614	5.759	5.907	167	1.417	1.474	1.532
102.2	5.387	5.53	5.673	168.8	1.37	1.426	1.482
104	5.172	5.31	5.451	170.6	1.326	1.379	1.434
105.8	4.966	5.101	5.238	172.4	1.282	1.335	1.389
107.6	4.769	4.901	5.034	174.2	1.241	1.292	1.344
109.4	4.582	4.71	4.84	176	1.201	1.25	1.302
111.2	4.402	4.527	4.654	177.8	1.162	1.211	1.261
113	4.231	4.353	4.477	179.6	1.125	1.172	1.221
114.8	4.067	4.186	4.307	181.4	1.089	1.135	1.183
116.6	3.911	4.027	4.144	183.2	1.055	1.1	1.146
118.4	3.761	3.874	3.989	185	1.021	1.065	1.111
120.2	3.618	3.728	3.84	186.8	0.9891	1.032	1.077
122	3.481	3.588	3.697	188.6	0.9582	1	1.044
123.8	3.35	3.454	3.561	190.4	0.9284	0.9697	1.012
125.6	3.225	3.326	3.43	192.2	0.8998	0.9401	0.9818
127.4	3.105	3.204	3.305	194	0.8721	0.9115	0.9522
129.2	2.99	3.086	3.185	195.8	0.8455	0.8839	0.9237
131	2.88	2.974	3.07	197.6	0.8198	0.8573	0.8961
132.8	2.774	2.866	2.959	199.4	0.795	0.8316	0.8696
134.6	2.673	2.762	2.854	201.2	0.7711	0.8069	0.8439
136.4	2.576	2.663	2.752	203	0.748	0.783	0.8192
138.2	2.483	2.568	2.655	204.8	0.7258	0.7599	0.7953
140	2.394	2.477	2.562	206.6	0.7043	0.7376	0.7722
141.8	2.309	2.39	2.472	208.4	0.6836	0.7161	0.7499
143.6	2.227	2.306	2.386	210.2	0.6635	0.6953	0.7283
145.4	2.149	2.225	2.304	212	0.6442	0.6752	0.7075
147.2	2.073	2.148	2.224	213.8	0.6255	0.6558	0.6874
149	2.001	2.074	2.148	215.6	0.6075	0.6371	0.6679
150.8	1.931	2.002	2.075	217.4	0.59	0.619	0.6491
152.6	1.865	1.934	2.005	219.2	0.5732	0.6015	0.631
154.4	1.801	1.868	1.937	221	0.5569	0.5846	0.6134
156.2	1.739	1.805	1.872				
158	1.68	1.744	1.81				
159.8	1.623	1.686	1.75				
161.6	1.569	1.63	1.692				
163.4	1.516	1.576	1.637				
165.2	1.466	1.524	1.583				

I. Troubleshooting

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

J. Sub assembly descriptions

J.1. Sub-Assembly Descriptions

J.1.1. Heating Coil Accessories
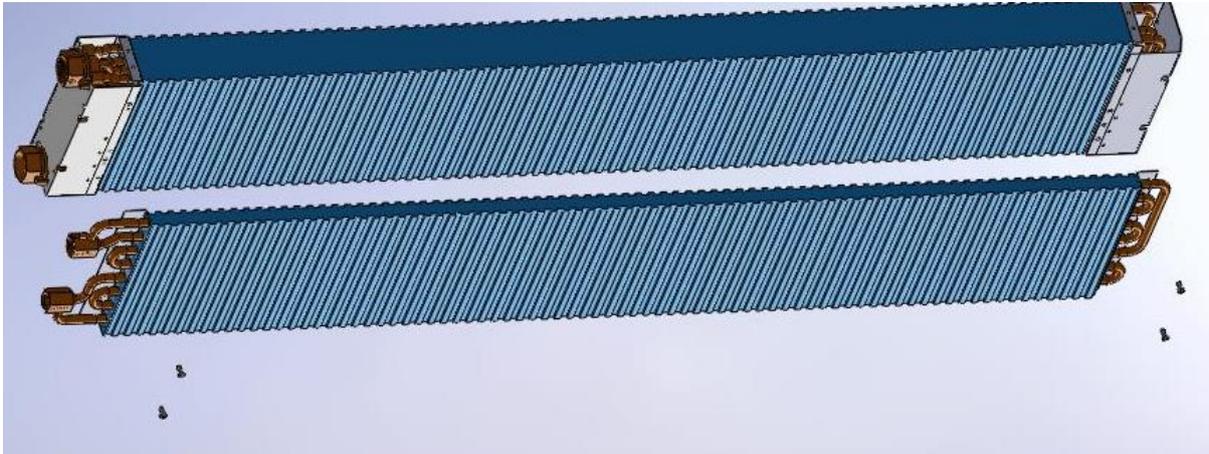
J.1.2. Electrical Heater Accessories

The electric heater module is supplied for winter heating as an alternative to the auxiliary hot water coil.
Electric Heater is installed in the same way and same position as the Auxiliary 1 row heating coil for 4-pipe system.
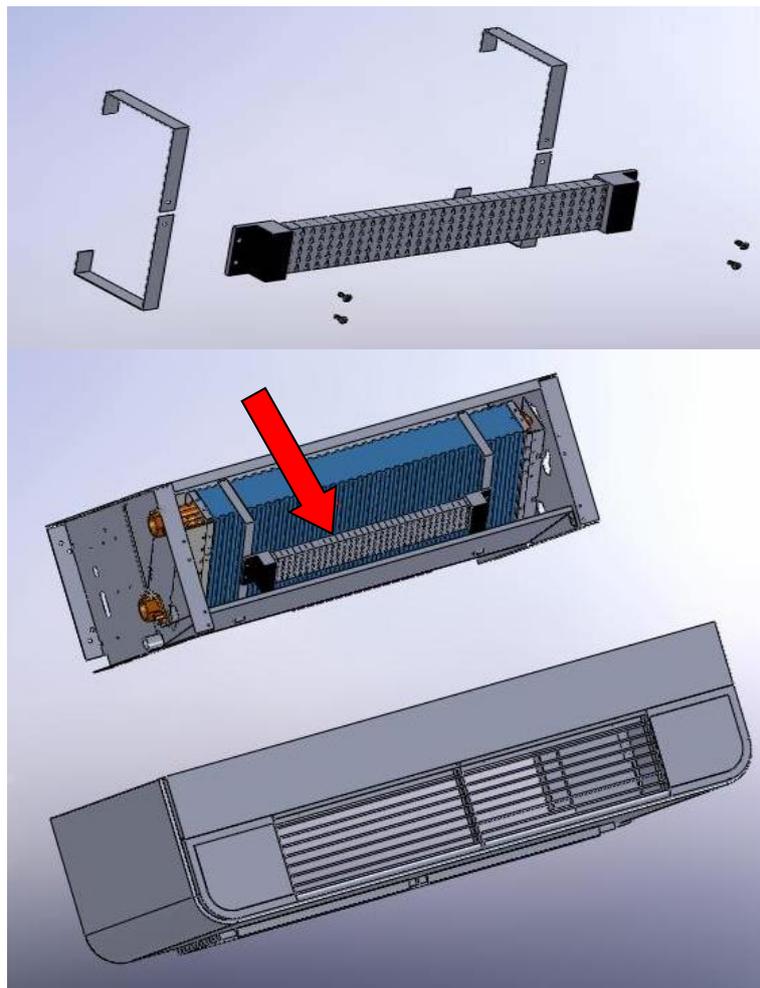
Note: For correct operation of the heaters, airflow should not drop below the values for minimum speed.

J.1.3. Auxiliary External Drain Pan

DPANPS-UNI-RH is a painted steel drain pan for suspended ceiling installation or built-in horizontal installation with right-sided coil connections.

DPANPS-UNI-LH is a painted steel drain pan for suspended ceiling installation or built-in horizontal installation with left-sided coil connections.

DPANPS-UNI-RHLH is a painted steel drain pan for floor standing installation, fixed wall installation and built-in vertical installations. Suitable for left-side and right-side unit coil connections.
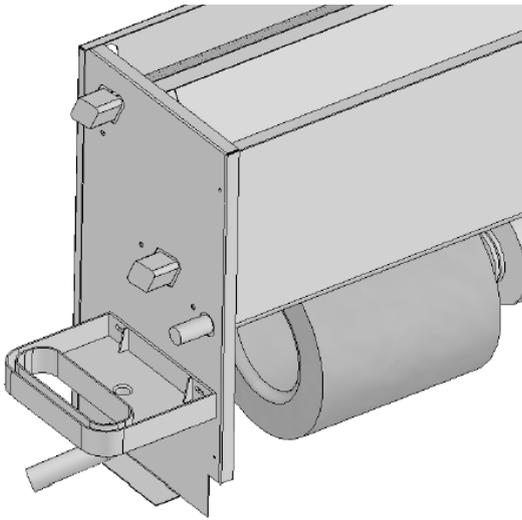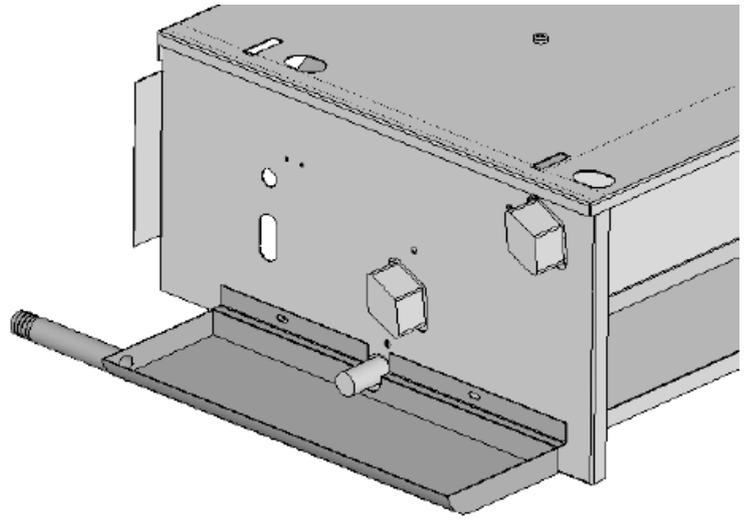
DPANPS-UNI-RHLH

DPANPS-UNI-RH / DPANPS-UNI-LH

J.1.4. ABS Supporting Feet

ABSFT UNI EXP1 ABS supporting feet for floor standing applications.

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