

EU50

HIGHWALL SERIES
INSTALLATION, OPERATION &
SERVICE MANUAL

SWC - ECM MOTOR



INVESTING IN QUALITY, RELIABILITY & PERFORMANCE

ISO 9001 QUALITY



Management Service

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

World Leading Design and Technology

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

CE SAFETY STANDARDS



Product Service

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

The Highest Standards of Manufacturing

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

EUROVENT CERTIFICATION



WEEE MARK



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

Quality Controlled from Start to Finish

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

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

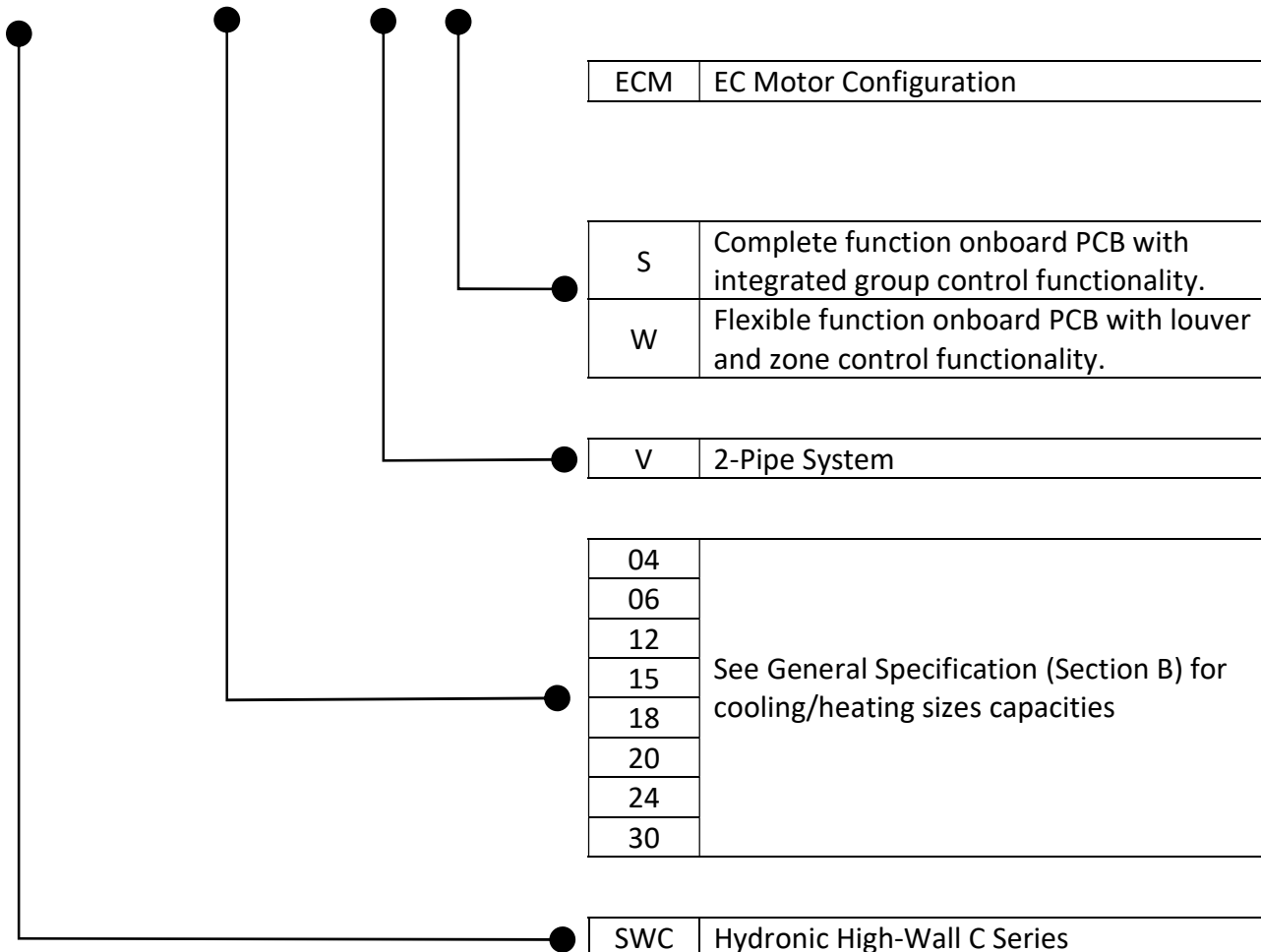
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Model Code Nomenclature

SWC - 06 - V S - ECM



A. Technical Data

A.1. General Description

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

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

Water Coil ~ the water coil has a large heat transfer surface and utilizes the latest fin profile technology. It combines an advanced technology approach with the security of a traditional design regarding tube thickness. The coil is constructed with seamless copper tubes and headers. The tubes are mechanically expanded into corrugated aluminum fin material for a permanent primary to secondary surface bond. The coil is tested at 35 bar and recommended for operating at 20 bar (excluding flexible hoses). It includes manual air vent and water purge valve.

Integral Hoses ~ an integral hose is a synthetic elastomer tube, with stainless steel outer braiding and brass connectors, which enables quick, low cost connections with no brazing.

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

Filters ~ washable, easy-to-remove, fine mesh air filters are standard to all high-wall models. Tabs located on the front of the unit can be unsnapped, allowing the filter to be easily slid downward and removed. No tools are required, nor any dismantling of the equipment.

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

Microprocessor Control ~ see sections D and F for control specifications and details. The main design features include:

- ~ FCEER rating class: A/B.
- ~ FCCOP rating class: B/C.
- ~ High efficiency EC motor with PID algorithmic processing in auto-mode.
- ~ 2-pipe, 2-pipe with booster electric heat, 2-pipe with primary electric heat, 4-pipe with 4x2 device installed.
- ~ Cool, Heat, Auto, Dehumidifier and Fan modes.
- ~ Sleep, Auto-Fan, Daily Timer, Auto-Restart with memory functions.
- ~ User friendly remote control handset.
- ~ Heat and cool temperature protections and safety cut out.
- ~ 2-way and 3-way on/off valve control.
- ~ Addressable control and error diagnostics (Master-Slave) for sub-networks of up to 32 units, with IR handset as global control interface.
- ~ Wired wall pad controller (optional) with 7-day programmable timer, real-time clock, network control (global and addressable) and error diagnostics.
- ~ Manual control panel in cabinet.
- ~ Auxiliary switch for cooling and heating signal.
- ~ Occupancy (remote on/off) contacts / economy mode contacts.
- ~ Open Modbus communication protocol.
- ~ Local PC host control solution (optional).

A.2. General Specifications

A.2.1. 2-pipe Systems

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



				SWC-[Size]-V~-ECM	04	06B	12B	15	
Unit Configuration	Configuration				2-pipe				
	Number Of Fan Blowers				Single				
	Power Supply		(V/Ph/Hz)		230/1/50 220/1/60				
	Operation Control				~S: Complete function onboard PCB with integrated group control functionality, incl. 1 pc return air sensor and 2 pcs temperature sensors. ~W: Flexible function onboard PCB with louver and zone control functionality, incl. 1 pc coil temperature sensors.				
Performance Data	Air	Air Flow	H	m ³ /hr	370	500	500	645	
			M		290	370	370	500	
			L		220	290	290	370	
	Cooling	Cooling Capacity ^e	H	kW	1	1.82	2.39	2.13	
			M		0.84	1.43	1.84	1.75	
			L		0.68	1.21	1.61	1.32	
		Sensible Cooling Capacity ^e	H		0.85	1.53	1.81	1.88	
			M		0.71	1.2	1.34	1.53	
			L		0.57	1	1.15	1.14	
		Latent Cooling Capacity	H		0.15	0.29	0.58	0.25	
			M		0.13	0.23	0.5	0.22	
			L		0.11	0.21	0.46	0.18	
	FCEER ^e	Rating		107.83	115.62	194.12	123.1		
		Class		C	C	A	B		
	Heating	Heating Capacity ^e	H	kW	1.2	2.23	2.65	2.63	
			M		1	1.76	2.07	2.14	
			L		0.82	1.38	1.69	1.68	
		Max. Electric Heater Capacity			1				
	FCCOP ^e	Rating		132.93	136.1	209.49	155.49		
		Class		C	C	B	C		
	Sound	Sound Pressure Level(Outlet)		dB(A)		34/29/24	39/31/26	40/33/28	45/34/31
		Sound Power Level (Outlet) ^e				42/38/33	45/35/33	49/42/37	54/43/40
	Electrical	Power input in cooling mode ^e	H	W	13	18	13	22	
			M		10	13	10	15	
L			5		10	8	10		
Power input in heating mode ^e		H	W	13	18	13	22		
		M		10	13	10	15		
		L		5	10	8	10		
Fan Motor Running Current @ H		A	0.11	0.16	0.11	0.19			
Hydraulic	Cooling Water Flow Rate	H	L/h	171	353	410	517		
		M		143	280	319	423		
		L		116	233	275	319		
	Cooling Pressure Drop ^e	H	kPa	22.8	28.8	27.5	38.5		
		M		16.8	18.7	16.6	27.5		
		L		11.8	11.8	13.2	15.6		
	Heating Water Flow Rate	H	L/h	256	376	456	548		
		M		213	301	362	456		
		L		173	249	297	362		
	Heating Pressure Drop ^e	H	kPa	18.4	29.4	29.0	38.9		
M		13.6		18.9	17.8	27.6			
L		9.4		11.7	12.8	16.5			
Water Content		L	0.045	0.0789	0.124	0.124			
Construction and Packing Data	Water Connections	Type		Socket (Threaded Female)					
		In	mm [in]	12.7 [1/2]					
	Out	16 [5/8]							
	Condensate Drainage Connection				876				
	Dimensions	L	mm	228					
		H		300					
Net Weight		kg	11	12	13	13			

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

Eurovent testing conditions:

a. Cooling mode (2-pipe):

- Return air temperature: 27C DB/ 19C WB.
- Inlet/ Outlet water temperature: 7C/ 12C.

b. Heating mode (2-pipe):

- Return air temperature: 20C.
- Inlet/ Outlet water temperature: 45C/ 40C.

Product range: SWC-ECM Hydronic High Wall with EC Motor



SWC-[Size]-V~-ECM				18	20	24B	30	
Unit Configuration	Configuration			2-pipe				
	Number Of Fan Blowers			Single				
	Power Supply		(V/Ph/Hz)	230/1/50 220/1/60				
	Operation Control			~S: Complete function onboard PCB with integrated group control functionality, incl. 1 pc return air sensor and 2 pcs temperature sensors. ~W: Flexible function onboard PCB with louver and zone control functionality, incl. 1 pc coil temperature sensors.				
Performance Data	Air	Air Flow	H	m³/hr	788	980	1080	1240
			M		740	760	980	1080
			L		570	600	600	760
	Cooling	Cooling Capacity ^e	H	kW	3.71	4.81	5.33	5.93
			M		3.26	3.9	4.78	5.12
			L		2.66	3.35	3.33	3.88
		Sensible Cooling Capacity ^e	H		2.74	3.46	3.88	4.34
			M		2.4	2.8	3.46	3.73
			L		1.94	2.38	2.38	2.8
		Latent Cooling Capacity	H		0.97	1.35	1.45	1.59
			M		0.86	1.1	1.32	1.39
			L		0.72	0.97	0.95	1.08
	FCEER ^e	Rating		181.35	208	165.52	141.61	
		Class		B	A	B	B	
	Heating	Heating Capacity ^e	H	kW	4.06	5.21	5.64	6.3
			M		3.86	4.23	5.21	5.64
			L		3.12	3.48	3.48	4.23
		Max. Electric Heater Capacity			1.5			
	FCCOP ^e	Rating		214.87	220.82	176.34	156.2	
		Class		B	B	B	C	
	Sound	Sound Pressure Level(Outlet)		dB(A)				
		Sound Power Level (Outlet) ^e		49/44/37	47/39/36	47/44/37	50/47/40	
	Electrical	Power input in cooling mode ^e	H	W	30	30	40	50
			M		20	20	30	40
L			13		15	19	25	
Power input in heating mode ^e		H	W	30	30	40	50	
		M		20	20	30	40	
		L		13	15	19	25	
Fan Motor Running Current @ H			A	0.26	0.26	0.35	0.43	
Hydraulic	Cooling Water Flow Rate	H	L/h	638	816	916	1014	
		M		559	662	816	881	
		L		456	573	573	662	
	Cooling Pressure Drop ^e	H	kPa	50	59.5	52.5	63.3	
		M		40	42.7	43.5	49.3	
		L		28	32.2	23.5	30.5	
	Heating Water Flow Rate	H	L/h	679	848	916	1012	
		M		650	705	848	916	
		L		538	589	589	705	
	Heating Pressure Drop ^e	H	kPa	51.5	58.4	51.4	62.4	
M		46.4		41.9	44.5	51.3		
L		32.1		31.6	22.6	31.3		
Water Content			L	0.192	0.252	0.252	0.252	
Construction and Packing Data	Water Connections	Type		Socket (Threaded Female)				
		In	mm [in]	12.7 [1/2]				
	Out	16 [5/8]						
	Condensate Drainage Connection			16 [5/8]				
	Dimensions	L	mm	876	1063			
		W		228	240			
H		300		310				
Net Weight			kg	14	16	16	16	

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

Eurovent testing conditions:

a. Cooling mode (2-pipe):

- Return air temperature: 27C DB/ 19C WB.
- Inlet/ Outlet water temperature: 7C/ 12C.

b. Heating mode (2-pipe):

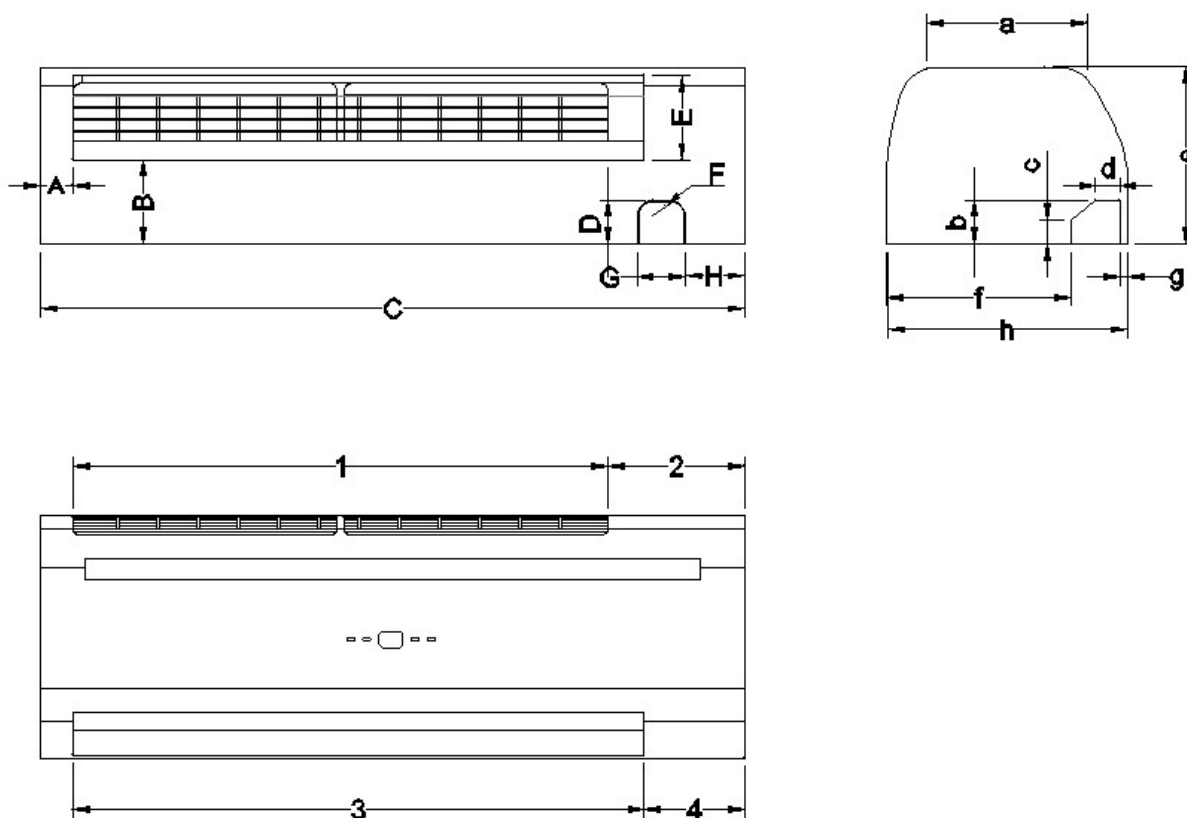
- Return air temperature: 20C.
- Inlet/ Outlet water temperature: 45C/ 40C.

A.3. Coil Data

Model	Fin Height (mm.)	Fin Length (mm.)	Fins per Inch	No. of Rows	No. of Copper	No. of Circuits	Tube Diameter
SWC-04	230	680	19.5	2	8	2	7
SWC-06	230	680		2	14	3	7
SWC-12	230	680		2	22	4	7
SWC-15	230	680		2	22	4	7
SWC-18	357	680		2	34	5	7
SWC-20	378	845		2	36	6	7
SWC-24	378	845		2	36	6	7
SWC-30	378	845		2	36	6	7

A.4. Dimensional Drawings

Dimensional drawing for SWC-04/06/12/15/18-ECM

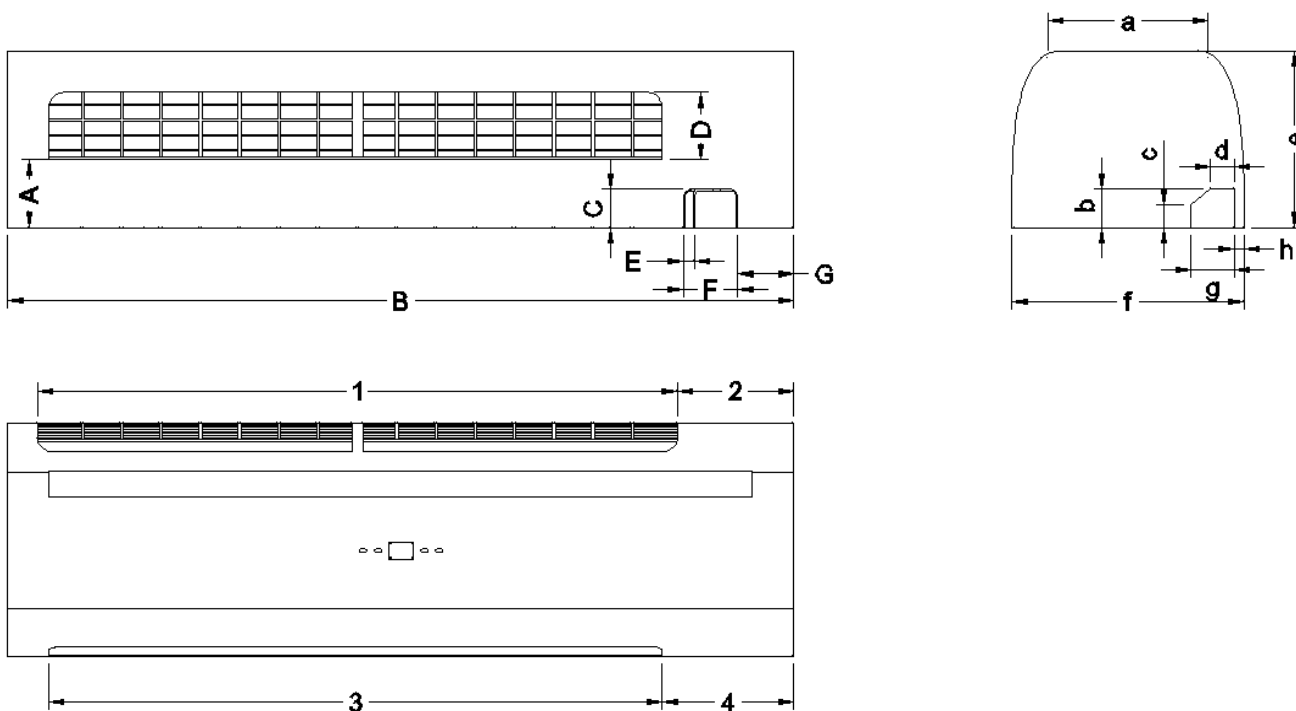


Model	Unit Dimensions (mm)							
	A	B	C	D	E	F	G	H
SWC-04/06/12/15/18	40	105	875	55	105	R20	60	74

Model	Unit Dimensions (mm)							
	a	b	c	d	e	f	g	h
SWC-04/06/12/15/18	200	55	30	30	220	229	10	300

Model	Unit Dimensions (mm)			
	1	2	3	4
SWC-04/06/12/15/18	665	170	710	125

Dimensional drawing for SWC-20/24/30-ECM



Model	Unit Dimensions (mm)						
	A	B	C	D	E	F	G
SWC-20/24/30	90	1050	51	90	15	73	74

Model	Unit Dimensions (mm)							
	a	b	c	d	e	f	g	h
SWC-20/24/30	215	52	30	32	235	310	58	13

Model	Unit Dimensions (mm)			
	1	2	3	4
SWC-20/24/30	855	155	820	175

A.5. Sound power data

Model	SWC-04-ECM			SWC-06-ECM			SWC-12-ECM			SWC-15-ECM			SWC-18-ECM			
Speed	H(700)	M(600)	L(500)	H(930)	M(700)	L(600)	H(930)	M(700)	L(600)	H(1150)	M(800)	L(700)	H(1300)	M(1100)	L(900)	
Sound Power dB(A)	39.4	36.2	36.2	49.0	39.8	35.7	49.0	39.8	35.5	56.0	43.9	39.5	60.0	54.5	47.5	
Sound Power in 1/3 Octave-bands under ESP: 0 Pa (dB)	20.0 Hz	23.7	20.1	16.5	15.8	19.8	17.1	15.8	17.4	18.3	21.1	19.9	19.9	14.7	23.8	19.0
	25.0 Hz	22.1	15.3	15.7	14.0	19.5	17.2	18.4	19.3	19.0	22.6	19.7	17.7	21.4	17.9	17.9
	31.5 Hz	22.3	14.7	18.3	23.2	16.6	21.8	19.6	22.2	15.3	22.7	16.3	18.4	21.2	17.9	19.1
	40.0 Hz	16.1	15.2	16.8	19.9	14.8	13.4	17.9	13.4	13.9	23.6	16.3	17.6	28.1	19.1	17.6
	50.0 Hz	16.9	17.3	17.8	22.0	17.8	16.6	20.8	20.2	20.2	20.3	20.2	18.9	23.2	26.0	20.8
	63.0 Hz	20.5	17.7	13.4	24.7	19.8	16.7	25.2	17.6	16.0	28.4	23.4	20.8	34.4	29.1	23.3
	80.0 Hz	17.2	16.9	9.8	26.1	20.3	12.4	27.2	19.8	16.4	32.1	21.0	21.8	38.8	31.2	26.0
	100.0 Hz	20.1	16.8	31.9	28.6	22.8	17.7	28.3	22.9	16.3	36.0	24.2	22.1	39.4	37.2	27.6
	125.0 Hz	23.5	27.8	14.6	32.1	26.3	25.9	27.7	25.9	25.9	38.0	27.3	26.3	43.2	34.6	28.8
	160.0 Hz	24.5	20.9	16.3	34.4	26.1	17.8	31.5	25.8	20.0	39.8	30.0	23.4	44.5	37.0	31.8
	200.0 Hz	23.5	19.5	16.1	33.2	26.0	17.7	31.0	22.3	19.2	39.2	29.6	23.9	44.6	37.5	31.3
	250.0 Hz	24.2	20.7	16.3	31.7	25.0	20.0	32.4	24.8	20.0	39.6	28.1	26.5	43.5	36.9	30.8
	315.0 Hz	26.0	23.3	21.8	35.2	25.6	22.1	34.0	25.0	22.4	40.9	30.5	25.7	45.0	40.4	34.3
	400.0 Hz	33.0	26.4	21.3	39.9	32.0	26.2	39.7	32.3	25.8	46.2	36.2	31.7	50.5	45.1	38.0
	500.0 Hz	32.0	24.5	25.4	42.3	31.1	25.1	43.1	31.7	25.4	47.5	37.9	32.4	50.9	46.3	41.3
	630.0 Hz	30.5	26.0	21.4	42.2	29.7	24.6	41.6	30.0	24.2	48.8	35.4	30.7	52.3	49.5	39.7
	800.0 Hz	27.1	22.8	18.0	37.6	27.9	22.6	38.0	27.5	21.3	46.5	32.8	28.2	50.8	44.4	37.2
	1000.0 Hz	28.4	22.9	20.2	39.5	28.6	23.1	40.2	27.8	22.9	48.5	33.6	28.8	52.6	45.7	39.1
	1250.0 Hz	25.0	21.0	19.6	36.3	24.7	21.0	36.2	24.7	20.9	45.2	30.5	24.3	49.1	43.9	35.0
	1600.0 Hz	23.3	22.4	20.7	32.8	22.6	21.6	33.0	22.8	21.6	42.7	26.7	22.8	47.1	39.4	31.3
	2000.0 Hz	20.6	20.0	19.4	29.6	20.8	19.8	30.0	20.7	19.6	39.4	23.4	21.2	44.4	36.8	28.0
	2500.0 Hz	20.6	20.0	19.8	26.9	20.9	20.0	27.5	20.4	20.3	36.7	22.2	20.4	41.6	34.1	25.9
	3150.0 Hz	21.0	20.6	20.6	24.5	20.9	20.7	25.0	21.0	20.6	33.3	21.9	20.9	38.3	31.3	23.7
	4000.0 Hz	20.7	20.5	20.8	23.1	20.8	20.8	23.6	20.6	20.6	31.5	21.3	20.7	36.6	29.5	22.9
	5000.0 Hz	20.7	20.8	20.5	21.8	20.7	20.6	22.0	20.7	20.5	27.8	20.9	20.6	32.7	25.9	21.6
	6300.0 Hz	20.4	20.2	20.1	20.5	20.2	20.0	20.6	20.2	20.1	24.5	20.3	20.2	29.1	23.1	20.4
8000.0 Hz	19.2	19.2	19.3	19.2	19.2	19.1	19.3	19.1	19.2	21.2	19.2	19.1	24.6	20.5	19.3	
10000.0 Hz	17.3	17.3	17.4	17.2	17.5	17.3	17.3	17.4	17.2	17.9	17.3	17.2	19.5	17.7	17.3	
12500.0 Hz	14.4	14.3	14.5	14.3	14.5	14.4	14.4	14.5	14.3	14.6	14.4	14.5	15.3	14.5	14.4	
16000.0 Hz	11.3	11.4	11.1	11.6	11.2	11.2	11.5	11.2	11.3	11.9	11.3	11.3	11.9	11.4	11.6	

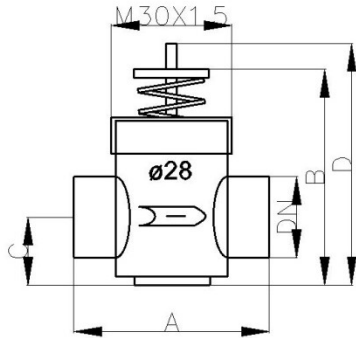
Model	SWC-04-18														
Speed	100RPM	200RPM	300RPM	400RPM	500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM	
Sound Power dB(A)	32.2	32.3	32.8	33.1	35.2	35.6	39.1	43.5	47.4	50.6	53.7	56.2	59.3	61.3	
Sound Power in 1/3 Octave-bands under ESP: 0 Pa (dB)	20.0 Hz	18.0	19.7	14.7	16.7	21.1	16.3	18.6	21.5	18.5	22.1	20.5	22.3	19.8	21.3
	25.0 Hz	18.8	17.9	17.6	17.6	17.2	18.2	22.7	22.0	17.8	19.4	16.7	18.5	20.0	15.1
	31.5 Hz	15.3	21.5	25.1	17.1	21.8	15.6	19.0	18.3	21.8	19.1	20.5	18.4	17.8	14.8
	40.0 Hz	14.3	15.2	15.5	16.7	14.7	14.4	12.7	18.5	15.8	16.3	20.7	23.5	23.2	22.6
	50.0 Hz	17.3	17.7	18.3	19.4	15.7	18.6	16.1	18.8	20.5	21.5	21.4	23.8	26.2	28.7
	63.0 Hz	12.1	11.2	19.2	16.6	12.9	17.6	20.3	17.8	23.1	27.5	27.9	26.6	31.6	34.0
	80.0 Hz	9.8	10.9	10.1	23.5	13.7	13.9	18.8	23.2	23.0	23.1	32.4	33.7	37.8	35.8
	100.0 Hz	18.4	19.4	13.1	12.8	34.6	16.5	18.4	22.2	26.2	27.2	35.6	38.1	40.5	39.5
	125.0 Hz	11.6	12.6	17.6	10.6	16.3	25.9	25.4	23.7	27.8	29.7	35.5	36.6	42.7	43.7
	160.0 Hz	14.9	11.4	12.5	15.1	15.3	22.5	25.0	27.9	30.3	34.8	37.9	38.9	41.4	45.1
	200.0 Hz	13.5	14.2	13.3	14.2	18.1	19.0	22.9	27.4	30.0	35.9	37.3	41.0	41.1	44.9
	250.0 Hz	11.4	12.8	10.8	16.0	16.3	20.4	22.5	26.8	29.9	33.8	36.5	39.5	42.3	46.0
	315.0 Hz	11.7	12.9	11.6	13.6	24.1	21.7	25.3	31.5	32.9	37.1	39.3	42.6	45.4	47.2
	400.0 Hz	13.7	14.0	12.7	15.8	22.8	26.4	31.5	35.7	38.4	40.1	43.7	46.2	49.6	52.5
	500.0 Hz	15.0	15.4	14.3	16.0	21.7	24.8	32.1	37.2	42.2	42.5	45.4	47.6	49.8	51.7
	630.0 Hz	17.4	16.3	16.1	17.1	21.2	24.2	29.8	34.6	40.0	45.1	47.8	48.9	50.7	52.3
	800.0 Hz	16.4	16.2	16.8	18.1	20.4	22.2	27.0	31.3	36.6	40.1	44.1	48.3	50.1	52.3
	1000.0 Hz	17.3	17.1	18.0	20.0	23.4	22.7	28.0	32.7	37.6	41.0	44.5	48.1	51.1	53.7
	1250.0 Hz	18.8	18.4	19.6	20.9	22.7	21.4	23.9	28.8	34.5	38.3	41.7	45.0	47.7	50.2
	1600.0 Hz	18.8	19.1	18.8	20.2	21.4	21.1	22.2	26.0	30.7	34.6	38.5	43.0	45.7	48.8
2000.0 Hz	19.2	19.8	20.1	19.9	20.9	19.9	20.9	23.1	27.6	32.4	36.5	39.7	43.0	46.2	
2500.0 Hz	19.6	20.0	19.9	19.8	20.3	20.2	20.6	21.6	25.0	28.8	33.2	37.4	40.5	43.6	
3150.0 Hz	20.2	20.4	20.3	20.1	20.6	20.7	21.1	21.2	23.4	26.0	30.3	33.6	37.0	40.5	
4000.0 Hz	20.4	20.4	20.4	20.8	20.4	20.7	20.8	21.0	22.6	24.6	28.9	32.8	36.3	39.5	
5000.0 Hz	20.4	20.6	20.4	20.5	20.6	20.5	20.6	21.0	21.4	22.7	25.3	28.8	32.0	35.6	
6300.0 Hz	20.3	20.2	20.1	20.3	20.4	20.2	20.1	20.5	20.5	20.9	22.5	25.1	28.3	31.4	
8000.0 Hz	19.1	19.2	19.2	19.1	19.1	19.2	19.2	19.1	19.2	19.2	20.0	21.6	23.8	27.1	
10000.0 Hz	17.5	17.4	17.3	17.6	17.4	17.3	17.3	17.3	17.3	17.5	17.7	18.0	19.1	20.9	
12500.0 Hz	14.6	14.5	14.4	15.1	15.1	14.3	14.2	15.8	14.4	14.3	14.6	14.7	15.3	17.1	
16000.0 Hz	11.0	11.1	11.0	15.2	15.6	11.2	11.2	25.1	11.6	11.5	11.5	12.0	12.1	12.8	

Model		SWC-20-ECM			SWC-24-ECM			SWC-30-ECM		
Speed		H(1100)	M(900)	L(800)	H(1200)	M(1100)	L(900)	H(1350)	M(1200)	L(900)
Sound Power dB(A)		53.8	49.2	44.6	57.3	53.8	49.4	60.3	56.9	49.4
Sound Power in 1/3 Octave-bands under ESP: 0 Pa (dB)	20.0 Hz	21.2	18.3	22.8	22.5	17.0	17.0	20.8	19.9	17.0
	25.0 Hz	18.7	20.6	24.2	20.4	16.2	20.5	21.4	19.1	20.5
	31.5 Hz	20.4	17.5	16.1	20.1	16.7	17.5	17.6	15.2	17.5
	40.0 Hz	21.3	12.9	17.3	21.8	18.7	16.2	23.2	24.3	16.2
	50.0 Hz	20.8	19.4	15.0	21.7	25.4	18.0	25.5	22.4	18.0
	63.0 Hz	27.1	22.1	18.7	25.6	27.8	23.2	29.0	28.9	23.2
	80.0 Hz	30.8	25.2	21.6	32.6	30.0	23.5	35.4	31.4	23.5
	100.0 Hz	31.4	29.2	22.6	34.6	31.3	27.9	37.0	34.3	27.9
	125.0 Hz	34.0	28.0	25.2	37.5	32.2	29.2	39.8	36.3	29.2
	160.0 Hz	33.0	30.1	27.6	37.3	36.6	32.2	43.4	38.3	32.2
	200.0 Hz	35.9	33.5	30.8	40.9	36.6	35.2	43.1	38.9	35.2
	250.0 Hz	39.3	32.6	28.4	39.7	38.5	34.0	41.4	39.8	34.0
	315.0 Hz	40.0	42.4	36.7	43.9	39.6	41.4	46.4	43.2	41.4
	400.0 Hz	42.6	38.7	34.8	46.6	42.8	39.5	50.1	46.1	39.5
	500.0 Hz	43.6	40.5	35.8	47.8	45.0	40.6	50.5	46.3	40.6
	630.0 Hz	47.0	41.1	36.5	49.6	46.9	40.8	52.3	49.8	40.8
	800.0 Hz	47.2	40.4	35.9	51.4	46.4	41.7	53.1	50.3	41.7
	1000.0 Hz	43.6	37.1	32.8	47.4	43.7	38.1	50.7	47.2	38.1
	1250.0 Hz	43.3	38.1	31.8	48.7	43.0	37.7	50.3	47.4	37.7
	1600.0 Hz	38.6	31.6	27.7	43.1	39.4	31.9	46.9	42.3	31.9
	2000.0 Hz	37.0	28.9	25.7	41.8	37.6	29.3	46.1	41.6	29.3
	2500.0 Hz	32.6	25.2	23.9	37.0	32.5	25.5	41.9	37.0	25.5
	3150.0 Hz	30.9	24.0	22.1	36.5	31.1	24.3	41.2	35.8	24.3
	4000.0 Hz	27.2	22.0	21.7	31.5	27.5	22.3	37.3	31.8	22.3
5000.0 Hz	24.1	21.1	21.2	28.0	24.2	21.3	33.5	28.3	21.3	
6300.0 Hz	22.6	20.8	21.9	24.3	22.4	20.6	29.2	24.8	20.6	
8000.0 Hz	19.8	19.6	19.2	20.9	20.0	19.5	25.2	21.4	19.5	
10000.0 Hz	17.6	17.4	17.5	17.9	17.6	17.4	19.5	18.0	17.4	
12500.0 Hz	14.6	14.6	16.0	14.7	14.6	14.6	15.2	14.7	14.6	
16000.0 Hz	11.8	11.9	18.0	12.1	11.9	11.7	12.3	12.1	11.7	

Model		SWC-20-24-30													
Speed	100RPM	200RPM	300RPM	400RPM	500RPM	600RPM	700RPM	800RPM	900RPM	1000RPM	1100RPM	1200RPM	1300RPM	1400RPM	
Sound Power dB(A)	32.7	32.3	33.0	34.6	35.2	36.9	40.2	45.1	48.6	51.8	54.3	56.9	59.2	61.3	
Sound Power in 1/3 Octave-bands under ESP: 0 Pa (dB)	20.0 Hz	19.4	19.5	20.8	20.0	18.9	19.8	17.0	19.9	15.5	20.0	21.2	19.9	19.1	22.5
	25.0 Hz	20.5	17.9	20.7	21.4	20.7	18.4	17.1	22.3	19.9	21.9	20.2	19.1	18.9	24.0
	31.5 Hz	19.8	16.2	17.0	20.4	15.6	17.7	19.5	20.9	15.6	13.3	18.0	15.2	19.2	16.1
	40.0 Hz	14.3	13.2	17.0	24.9	14.0	17.8	18.6	20.3	19.0	16.5	19.0	24.3	24.8	21.5
	50.0 Hz	19.0	15.8	18.7	17.0	18.3	16.9	17.9	20.3	17.2	18.8	22.3	22.4	25.0	26.0
	63.0 Hz	16.2	15.1	18.5	18.6	19.5	19.2	18.5	18.2	19.5	24.3	25.8	28.9	28.0	30.0
	80.0 Hz	12.7	14.8	12.5	24.9	12.0	13.2	17.1	20.7	24.1	28.5	33.2	31.4	35.3	35.4
	100.0 Hz	14.4	14.5	12.0	16.2	25.7	17.8	20.7	23.0	28.7	27.4	33.7	34.3	36.4	37.6
	125.0 Hz	10.7	12.1	17.7	16.0	18.9	20.9	23.2	24.9	28.3	33.9	34.8	36.3	36.8	42.9
	160.0 Hz	12.3	13.1	12.4	20.5	17.7	24.2	27.0	30.0	31.4	31.8	35.1	38.3	42.6	44.2
	200.0 Hz	13.5	13.6	12.5	13.5	23.2	21.6	29.6	34.2	34.6	35.1	38.8	38.9	43.0	43.3
	250.0 Hz	11.5	12.8	11.0	13.4	15.0	24.8	29.2	29.4	33.9	37.8	38.3	39.8	41.5	41.3
	315.0 Hz	13.8	12.7	15.0	18.3	19.2	22.7	29.4	36.2	40.0	36.5	40.9	43.2	46.0	46.9
	400.0 Hz	15.3	15.6	15.6	17.1	21.7	25.9	31.0	33.9	38.2	41.0	44.3	46.1	49.1	51.1
	500.0 Hz	17.3	15.9	16.2	19.6	19.9	26.0	31.5	37.3	40.0	42.1	44.2	46.3	49.3	51.8
	630.0 Hz	18.0	17.8	17.2	21.5	20.3	26.3	31.7	36.6	40.7	45.1	47.5	49.8	51.3	53.3
	800.0 Hz	17.4	17.8	18.0	21.7	21.6	26.2	31.4	35.9	40.6	45.1	47.3	50.3	51.8	54.5
	1000.0 Hz	18.2	18.5	19.6	21.7	21.5	24.7	28.7	32.9	37.6	41.6	44.4	47.2	49.4	52.1
	1250.0 Hz	19.2	19.1	20.7	21.6	24.5	26.0	28.6	32.7	36.0	41.2	44.2	47.4	49.2	51.4
	1600.0 Hz	18.7	18.8	18.9	19.2	20.4	21.3	23.5	27.1	31.3	35.8	39.5	42.3	45.5	48.3
	2000.0 Hz	19.7	19.4	19.5	19.9	20.0	20.8	21.8	25.6	29.6	34.1	37.6	41.6	44.9	47.3
	2500.0 Hz	19.6	19.7	19.7	19.9	20.0	20.2	20.8	22.7	25.6	29.8	33.6	37.0	40.2	43.5
	3150.0 Hz	20.2	20.3	20.1	20.3	20.3	20.8	21.0	22.1	24.0	27.8	31.6	35.8	39.6	42.8
	4000.0 Hz	20.6	20.5	20.6	20.3	20.7	20.7	21.0	21.2	22.4	24.6	28.1	31.8	35.6	39.1
	5000.0 Hz	20.3	20.6	20.5	20.6	20.7	20.5	20.7	20.8	21.2	22.7	24.8	28.3	31.7	35.3
	6300.0 Hz	20.2	20.2	20.1	20.2	20.4	20.3	20.6	20.6	20.3	21.3	22.6	24.8	27.4	31.0
	8000.0 Hz	19.4	19.5	19.3	19.3	19.6	19.3	19.2	19.2	19.4	19.8	19.9	21.4	23.5	26.8
	10000.0 Hz	17.5	17.6	17.5	17.5	17.5	17.5	17.5	17.5	17.4	17.4	17.6	18.0	18.7	20.2
12500.0 Hz	14.6	14.6	14.7	14.7	14.6	14.7	14.6	14.6	14.6	14.6	16.4	14.7	14.9	15.5	
16000.0 Hz	11.7	11.6	11.7	11.7	11.8	11.9	11.7	11.9	11.9	11.9	24.6	12.1	12.3	12.4	

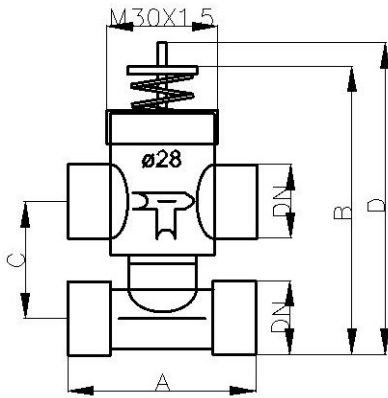
A.6. Valve Information (Optional)

2-Way Valve Body



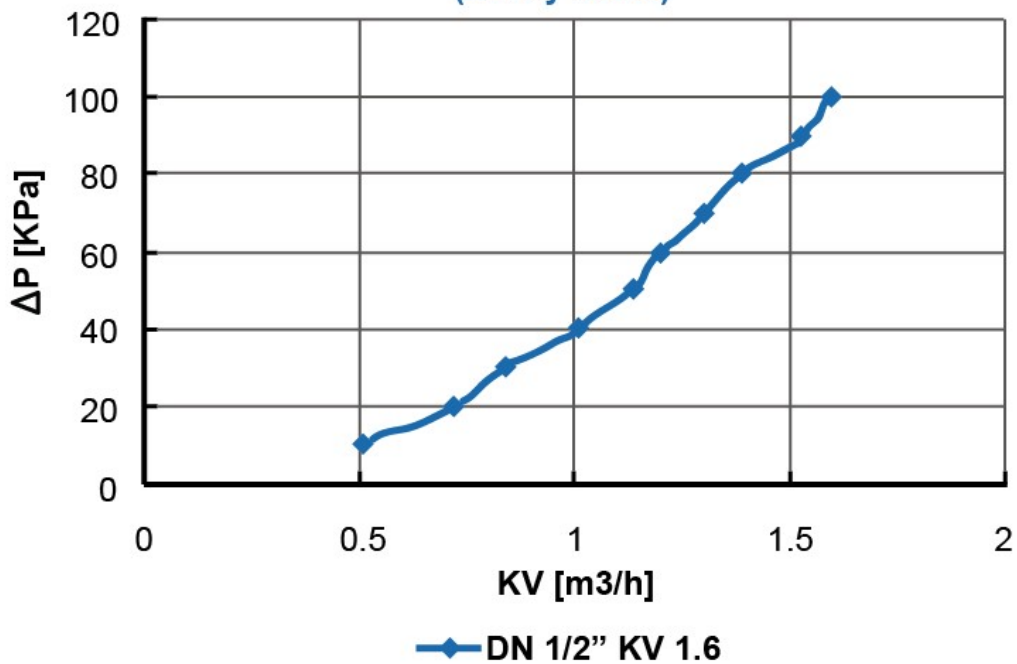
Valve Code (valve body + ON/ OFF thermoelectric actuator)	Valve Body Dimensions (mm)				
	DN	A	B	C	D
SGS14HFCA-23020101	D15 (G1/2")	52	47	19.5	63

3-Way Valve Body



Valve Code (valve body + ON/ OFF thermoelectric actuator)	Valve Body Dimensions (mm)				
	DN	A	B	C	D
SGS14HFCA-23020102	D15 (G1/2")	52	70	40	86

**Differential Pressure Chart
(2-Way Valve)**



A.7. Drain Pump and Installation Fixture (Optional)

Upon request, the metal bracket for fixing the drain pump and drain pump kits can be offered and preinstalled as optional. Please consult our sales representatives for these optional accessories.



Sauermann condensate drain pump kits (optional)



Metal bracket for fixing the drain pump on the unit (optional)

B. Installation

B.1. Safety Precautions

- When installing, performing maintenance or servicing Polar Air fan coil units observe the precautions stated in this manual as well as those stated on the labels attached to the unit.
- Ensure all local and national safety codes, laws, regulations, as well as general electrical and mechanical safety guidelines are followed for installation, maintenance and service.
- The appliance is for indoor use only.
- Ensure the correct power supply is provided.
- If the power supply cord is damaged, it must be replaced by qualified personnel.
- Installing and servicing fan coil unit should be performed by qualified service personnel only.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons lacking in experience and knowledge of the appliance, unless they have been given supervision or instruction concerning it.
- User of this appliance is responsible for his/her own safety.
- Warranty shall be voided if installation instructions and safety precaution stated in this manual are not observed.
- The unit should only be switched off by using the ON-OFF button on the control interface.

CAUTIONS

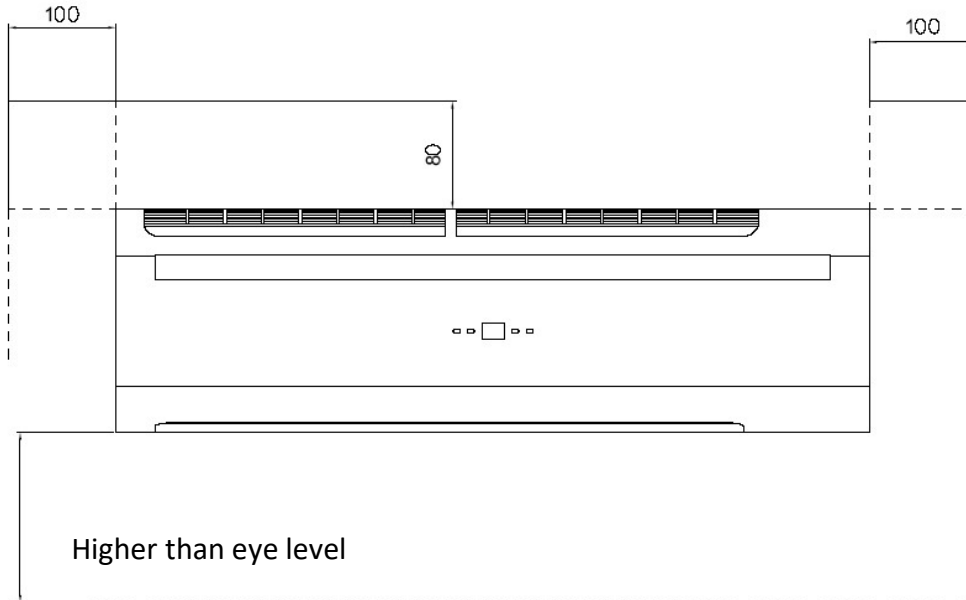
Before any service or maintenance operations turn off the mains electrical supply.

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

B.2. Before Installation

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

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



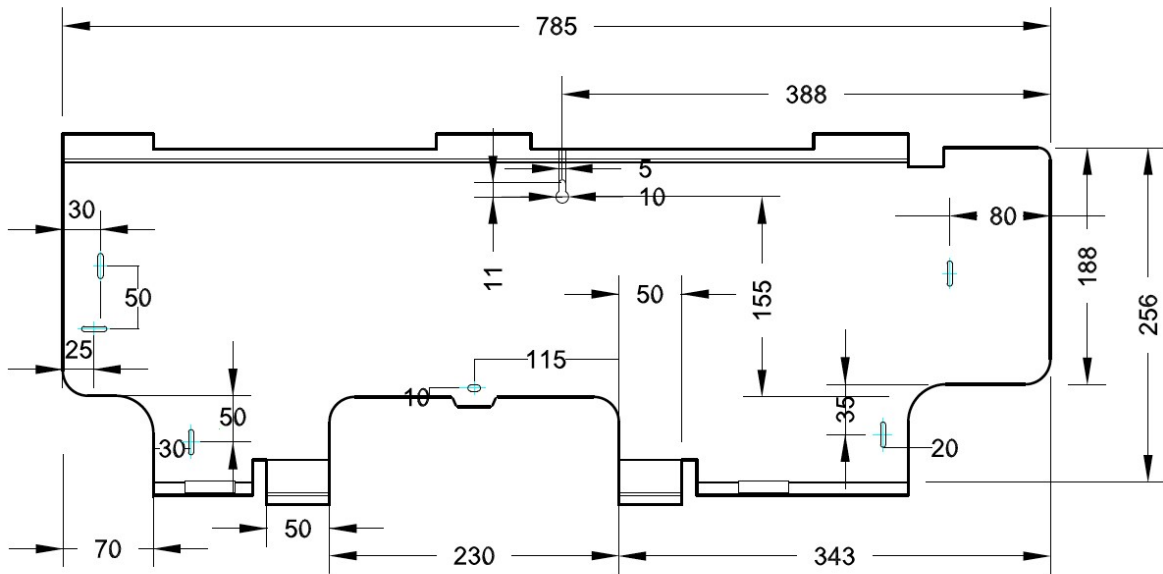
* Required clearance for maintenance and servicing is as shown above.

** All dimensions shown in mm.

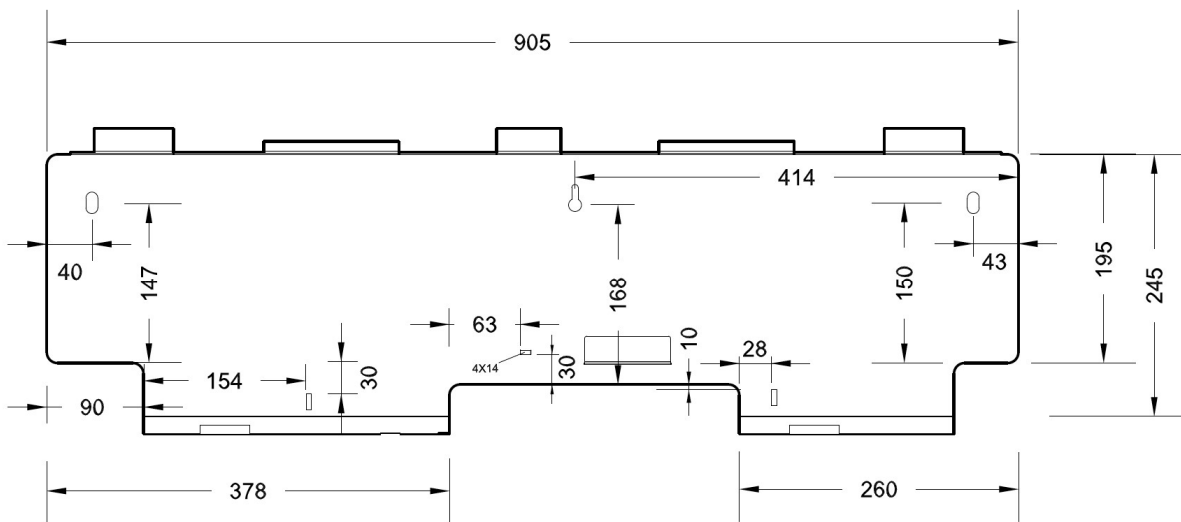
5. The unit should be installed higher than eye level.
6. Avoid installing the unit with direct sunlight.
7. The signal receiver on the unit must be kept away from any high frequency emission source.
8. Keep the unit away from fluorescent lamps, which may affect the control system.
9. Avoid electromagnetic control system interference, ensure control wires are installed separately from 110-240 VAC power supply wires.
10. Use shielded sensor cables in where electromagnetic waves present,
11. Install a noise filter if the power supply creates any disruptive noises.

B.3. Mounting Plate Dimensions

SWC-04/06/12/15/18 –ECM



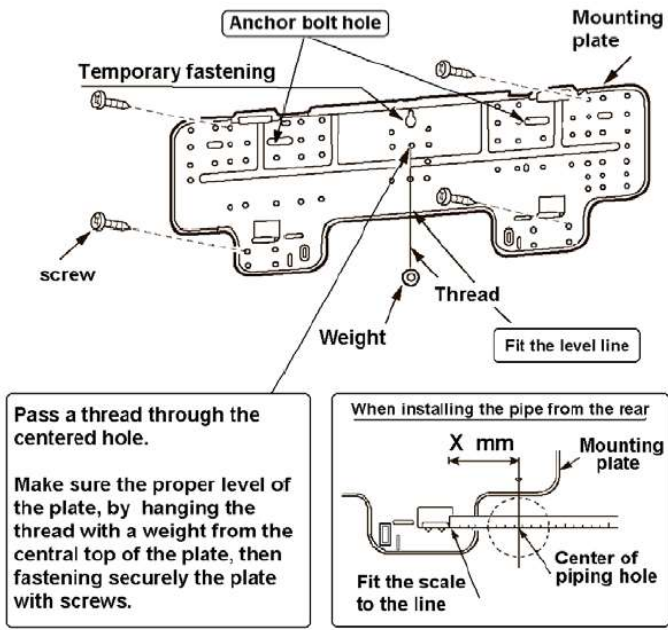
SWC-20/24/30 –ECM



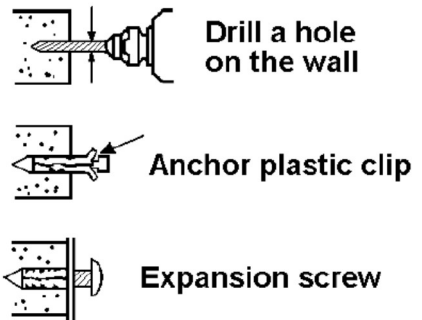
(All dimensions shown in mm)

B.4. Mounting Plate Installation

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

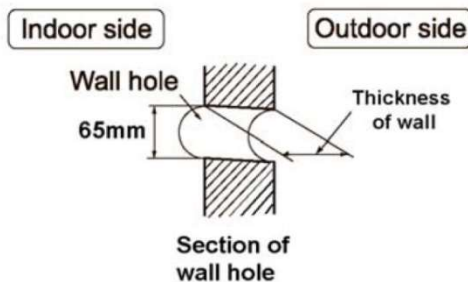


3. Mount the mounting plate horizontally as shown in the above figure or by means of gradiometer. Failed to follow this may cause water to drip indoors and create atypical noise.
4. Fix the mounting plate by means of expansion screws or tapping screws.



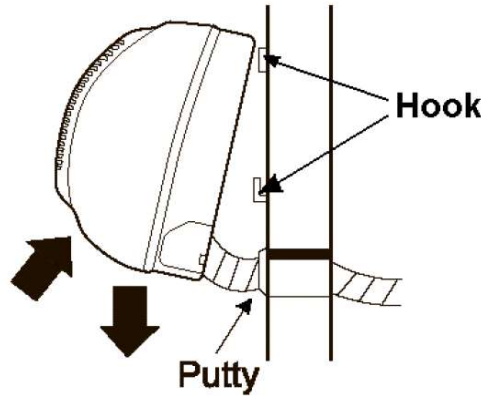
B.5. Condensate Drainage Hole Drilling

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



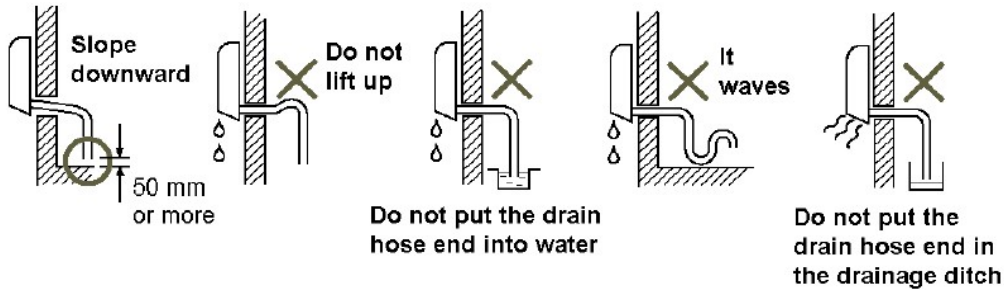
B.6. Hydronic Unit Installation

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

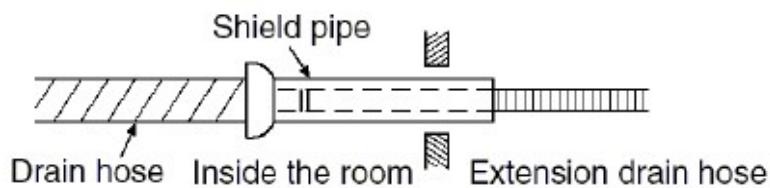


B.7. Drainage Piping Works

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



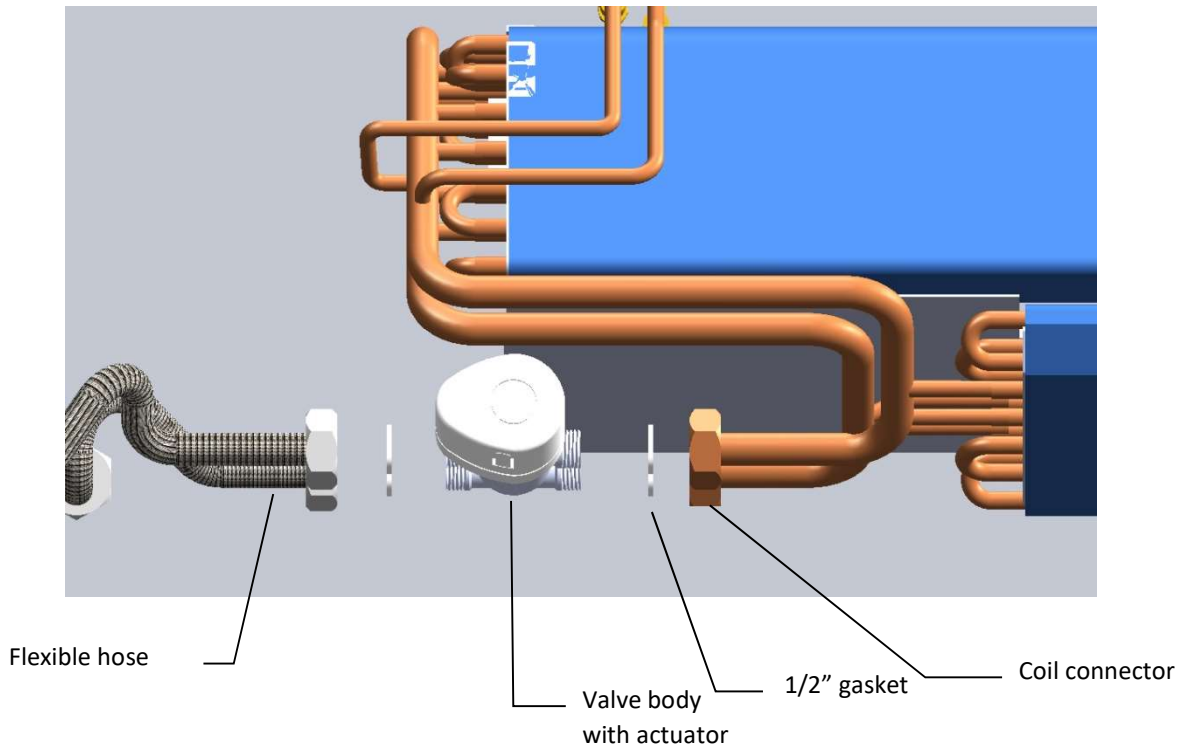
2. Put water in the drain pan and make sure that the water drains outdoors.
3. If the flexible drain hose provided with the indoor unit is not long enough, please extend it by joining it to an extension hose (not provided). Be sure to insulate the connecting part of the extension drain hose with a shield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



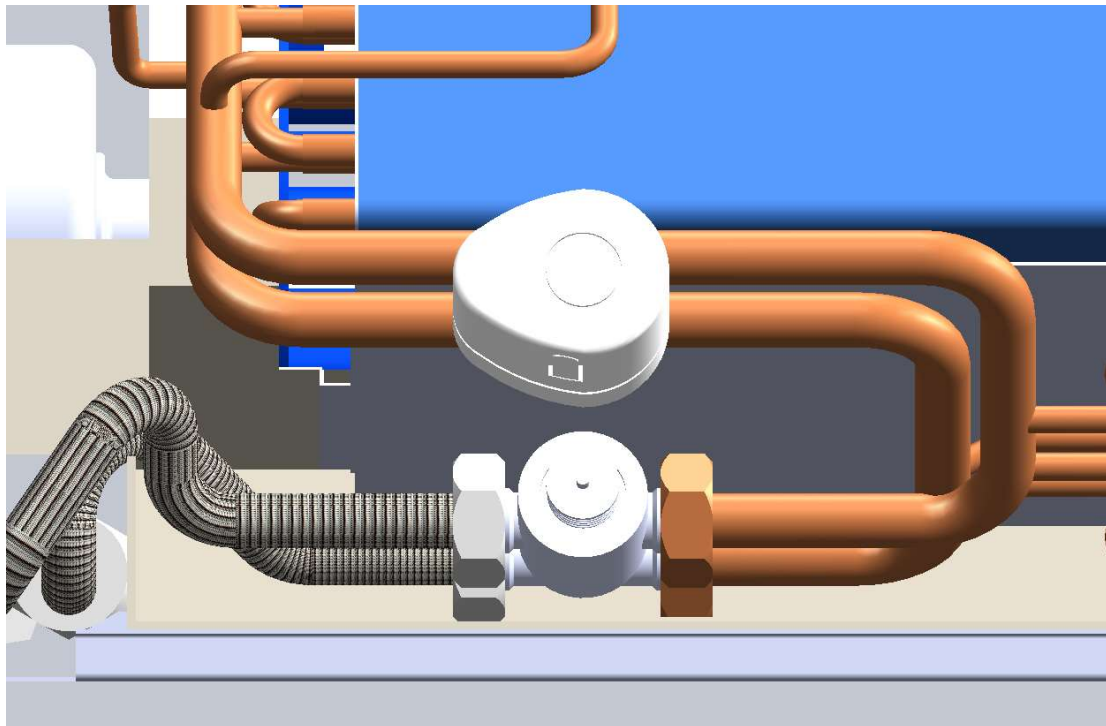
4. If the attached drain hose passes through an indoor area, insulate it with heat insulation material.

Pipe Connections with Valve

Pre-assembly



Complete Assembly



C. Maintenance

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



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



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

C.2. Front Cover Assembly Removal

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

C.3. Air Vent and Water Purge Valves

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

C.4. Wiring Connections

Unit components are wired to the terminal block of the indoor unit. Wiring can be accessed from the terminal block inside the control box.

D. Control Specifications: Complete Function PCB – S TYPE CONTROL

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 Motorized valve

MTV2 = Hot Motorized valve

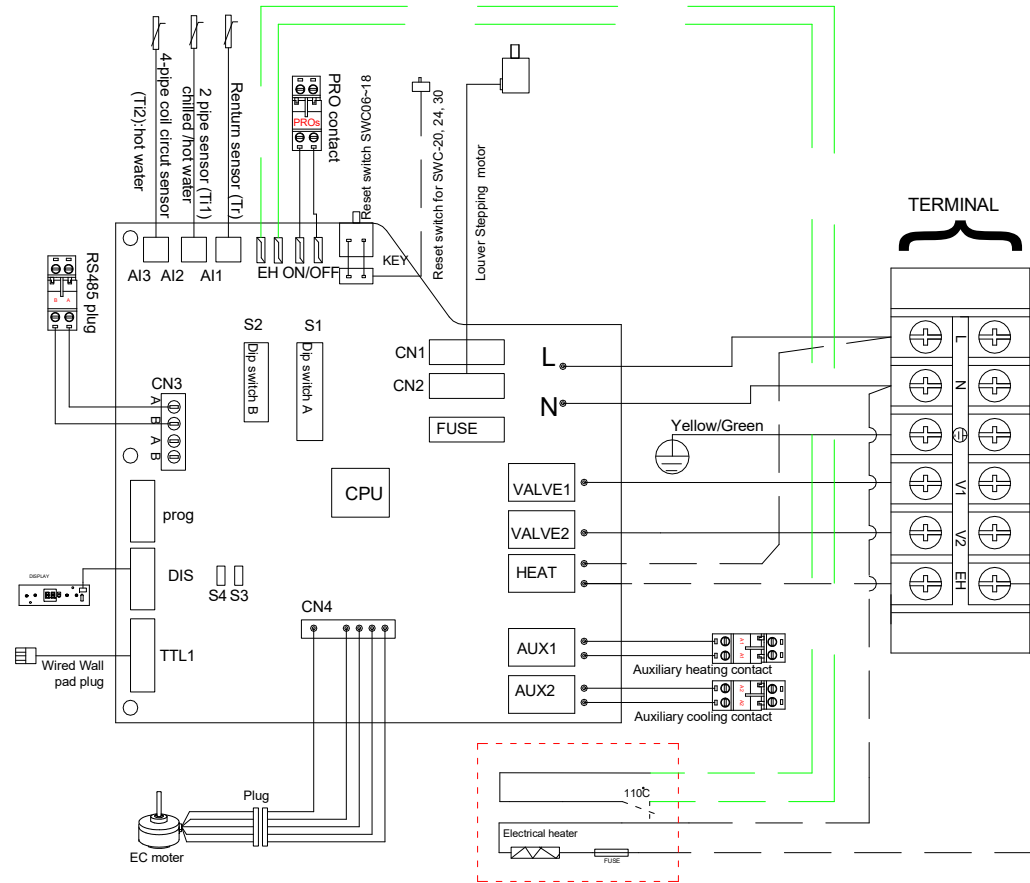
D.1. I/O Port Definitions

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-DIS1	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 contacts: for remote activation of economy mode (when DIPB SW1 = 0).	
	Electrical heater safety switch	EH	Voltage-free (NC). The contact is closed before the EH is turned on.	
Power input	Phase	L1	Power supply to the PCB and all the loads connected to the voltage outputs.	
	Neutral	N1	Power supply to the PCB and all the loads connected to the voltage outputs.	
	Earth		Power supply to the PCB and all the loads connected to the voltage outputs.	
Voltage output	Fan	CN4	Fan driver	
	Valve 1	MTV1	2-pipe coil circuit valve output – chilled / hot water valve. Voltage output (L)	4-pipe coil circuit valve output – chilled water valve. Voltage output (L)
	Valve 2	MTV2	Reserved	4-pipe coil circuit valve output – hot water valve. Voltage output (L)
	Voltage of electrical heater (Live)	HEAT	Voltage output (L), maximum 25 A	
Output	Stepping motor	CN1 / CN2	Louver stepping motor relay	
	Auxiliary contact 2	AUX2	Cooling mode signal relay (NO). Voltage free contact.	
	Auxiliary contact 1	AUX1	Heating mode signal switch (NO). Voltage free contact.	
	Serial BUS port	CN3	Master-slave network serial connection OR MODBUS / local PC host network serial connection.	

D.2. Wiring Diagrams

D.2.1. 2-pipe system

SWC-EC-S Unit wiring scheme



Legend:

DIPA-S1

IPA20-OEM-SWC-EC-S

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 with 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

SW2: Unit configuration setting: 0=2pipe system; 1=4-pipe system;

SW3: on/off valve configuration:0= no valve 1=with valve

SW4:preheat setting: 0=36C; 1=28C

SW5,SW6,S3(jump)----RPM selection.

L/N----Power supply

VALVE1:230V on/off valve output;

VALVE2:230V on/off valve output;

HEAT----Electrical heater

A11:Return air temperature sensor(Tr) ;

A12:Indoor coil temperature sensor1 (Ti1) ;

A13:Indoor coil temoeraturesensor 2 (Ti2) ;

AUX1:Voltage free contact; ON:unit in heating mode.

AUX2:Voltage free contact; ON:unit in cooling mode.

ON/OFF:Occupancy contact

CN1, 2---Stepping motor

CN3---Serial BUS contacts.

CN4---Ec motor

DIS---Led receiver display

TTL---wired wall pad

D.3. Configuration Settings

There are 2 DIP switches set on the PCB

1. DIPA-S1 (8 positions)
 - SW1 – SW6: used for master-slave / BMS network address.
 - SW7 – SW8: used for operating mode configuration.

2. DIPB-S2 (6 positions)
 - SW1: Occupancy / economy mode selection.
 - SW2: 2-pipe / 4-pipe configuration selection.
 - SW3: Thermoelectric valve configuration selection (2-pipe system only).
 - SW4: Pre-heat protection temperature selection.
 - SW5 – SW6: brushless DC fan motor configuration.

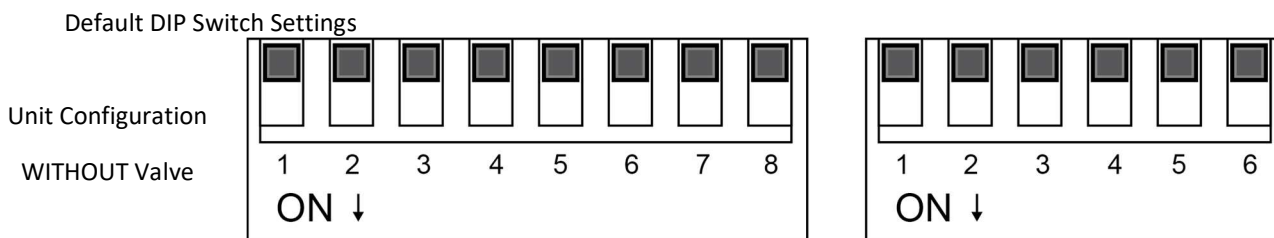


Figure 1

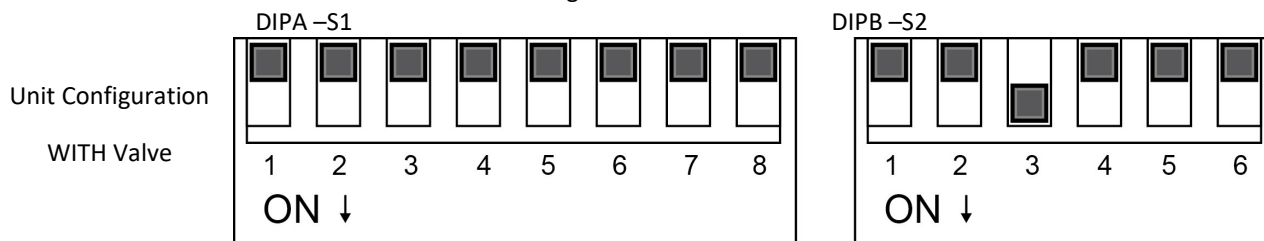


Figure 2

3. Thermoelectric Valve Configuration

On board DIP switch SW3 of DIPB is used for this configuration.

SW3	Thermoelectric valve (MTV)	0=OFF
1	With valve	1=ON
0	No valve	

4. Unit Configuration

On board DIP switches of DIPB are used for the below configurations.

SW1	PR-O contact setting
0	Economy contact
1	Window contact

SW2	System setting
0	2-pipes system
1	4-pipes system

SW4	Preheat setting
1	28°C
0	36°C

5. Motorized Fan Speed Settings for Different Models on DIPB

Unit Model	Speed (RPM)			S3	SW5	SW6
	Low	Medium	High			
SWC-04	500	600	700	0	0	0
SWC-06	600	700	900	0	1	0
SWC-12	600	700	950	0	0	1
SWC-15	700	800	1100	0	1	1
SWC-18	900	1100	1300	1	0	0
SWC-20	800	900	1100	1	1	0
SWC-24	900	1100	1200	1	1	1
SWC-30	900	1200	1350	1	0	1
Default RPM	900	1200	1350	1	1	1

6. Mode configuration

DIPA-S1		Model
SW7	SW8	Model setting
0	0	Cool-Heat
0	1	Cool-Heat + booster heater
1	0	Cooling only
1	1	Cool + primary heater

7. High Wall Unit ON/OFF

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

- By the ON/OFF button on the handset or wired wall pad.
- By the programmable timer on the handset or wired wall pad.
- By the manual control button on the high wall unit.

8. Power On Setting

- Handset only user interface: When the power ON signal is received by the high wall unit, the Mode, Fan Speed, Set temperature and Louver setting will be the same as the handset setting before the last power OFF.
- Wall-pad only OR wall-pad and handset user interface: When the power ON signal is received by the high wall unit, the Mode, Fan Speed, Set temperature, Louver 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 Thermoelectric Valve Configuration

COOL MODE

- a) MTV2, AUX1 and electric heater are always off.
- b) If $T_r \geq T_s + 1^\circ\text{C}$ (or $+ 4^\circ\text{C}$ if economy contact is activated), then cool operation is activated and MTV1 and AUX2 are turned on. Indoor fan runs at set speed.
- c) If $T_r < T_s$, then cool operation is terminated and MTV1 and AUX2 are turned off. Indoor fan runs at set speed.
- d) The range of T_s is $16 - 30^\circ\text{C}$
- e) Indoor fan speed can be adjusted to 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, the indoor fan will shut down after 5 seconds.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

- a) If $T_{i1} \leq 2^\circ\text{C}$ for 2 minutes, then MTV1 and AUX2 are turned off. If indoor fan is set for low speed, then it will run at medium speed. If it is set at medium or high speed, then it will keep running at the same speed.
- b) If $T_{i1} \geq 5^\circ\text{C}$ for 2 minutes, then MTV1 and AUX2 are turned on. Indoor fan 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 to low, medium and high.

HEAT MODE

Without Electrical Heater

- a) MTV2, AUX2 and electric heater are always off.
- b) If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and MTV1 and AUX1 are turned on. Indoor fan runs at the set speed.
- c) If $T_r > T_s$, then heat operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.
- d) The range of T_s is $16 - 30^\circ\text{C}$.
- e) Indoor fan speed can be adjusted to 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.

With Electrical Heater as Booster

- a) MTV2 and AUX2 are always off.
- b) If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and MTV1 and AUX1 are turned on. Indoor fan runs at the set speed.
- c) If $T_r > T_s$, then heat operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.
- d) If $T_{i1} < 40^\circ\text{C}$, then the electrical heater is turned on. If $40^\circ\text{C} \leq T_{i1} < 45^\circ\text{C}$, then the electrical heater maintains its original state. If $T_{i1} \geq 45^\circ\text{C}$, then the electrical heater is turned off.
- e) The range of T_s is $16 - 30^\circ\text{C}$
- f) Indoor fan speed can be adjusted to low, medium, high and auto.
- g) When turned on, MTV1 requires 30 seconds before it is fully open.
- h) When turned off, MTV1 requires 120 seconds before it is fully closed.

With Electrical Heater as Primary Heat Source

- a) MTV1, MTV2, and AUX2 are always off.
- b) If $T_{i2} \leq 30^\circ\text{C}$ (or T_{i2} is damaged or not connected)
 - i. If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and the electrical heater and AUX1 are turned on. Indoor fan runs at set speed.
 - ii. If $T_r > T_s$, then heat operation is terminated and the electrical heater and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.

- c) If $T_{i2} > 30^{\circ}\text{C}$, MTV2 and AUX2 are off.
 - i. If $T_r \leq T_s - 1^{\circ}\text{C}$ (or $- 4^{\circ}\text{C}$ if economy contact is activated), then heat operation is activated and the electrical heater is turned off while MTV1 and AUX1 are turned on. Indoor fan runs at set speed.
 - ii. If $T_r > T_s$, then heat operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.
- d) The range of T_s is 16 - 30 $^{\circ}\text{C}$.
- e) Indoor fan speed can be adjusted to low, medium, high and auto.

PRE-HEAT

Without Electrical Heater

- a) If $T_{i1} < 36^{\circ}\text{C}$ [or $< 28^{\circ}\text{C}$ is selected by DIPB-S2 position SW4], then MTV1 and AUX1 are turned on, indoor fan runs at Modbus 310000 setting.
- b) If $T_{i1} \geq 38^{\circ}\text{C}$ [or $\geq 30^{\circ}\text{C}$ is selected by DIPB-S2 position SW4], then MTV1 and AUX1 are turned on, indoor fan runs at set speed.
- c) If the indoor coil temperature sensor is damaged, then the pre-heat time is set for 2 minutes. Indoor fan runs at set speed.

With Electrical Heater

- a) If the indoor fan speed $\geq 300\text{rpm}$, then the electrical heater will turn on.

POST-HEAT

Without Electrical Heater

- a) If $T_{i1} \geq 38^{\circ}\text{C}$, then MTV1 and AUX 1 are off, then indoor fan continues to run at set speed.
- b) If $36^{\circ}\text{C} \leq T_{i1} \leq 38^{\circ}\text{C}$, then MTV1 and AUX1 are turned off. Then indoor fan maintains its original state.
- c) If $T_{i1} < 36^{\circ}\text{C}$, then MTV1 and AUX1 are turned off. Then indoor fan runs at 200rpm for 30 seconds, then shuts off.
- d) If the indoor coil temperature sensor is damaged, then the post-heat time is set for 3 minutes. Indoor fan runs at set speed.

With Electrical Heater

- a) Indoor fan will be turned OFF after the unit has been turned off for 20 seconds.

OVER-HEAT PROTECTION OF INDOOR COIL

- a) If $T_{i1} \geq 75^{\circ}\text{C}$, then MTV1 and AUX1 are turned off. Indoor fan remains on and runs at high speed.
- b) If $T_{i1} < 70^{\circ}\text{C}$, then MTV1 and AUX1 are turned on. Indoor fan remains on and runs at set speed.
- c) If the indoor coil temperature sensor is damaged, then the protection mode will be overridden 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 $T_r \geq 25^\circ\text{C}$, then MTV1 and AUX2 will be ON for 3 minutes, and then OFF for 4 minutes.
- c) If $16^\circ\text{C} \leq T_r < 25^\circ\text{C}$, then MTV1 and AUX2 will be ON for 3 minutes, and then OFF for 6 minutes.
- d) If $T_r < 16^\circ\text{C}$, then MTV1 and AUX2 will be turned off for 4 minutes.
- e) At the end of the above dehumidification cycle, the system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process.

AUTOMODEWithout Electric heater and With Electric Heater as Booster

- a) Every time the unit is turned on, MTV1 is on while AUX1, AUX2 and fan are off. MTV2 and the heater are always off. After 120 seconds, the subsequent operation mode is decided according to the following:
 - i. If the coil temperature sensor (T_{i1}) $\geq 36^\circ\text{C}$, then MTV1, AUX1 and fan turn on or off according to HEAT mode.
 - ii. If $T_{i1} < 36^\circ\text{C}$, then MTV1, AUX2 and fan turn on or off according to COOL mode.
- b) Unit remains in AUTO COOL or AUTO HEAT mode throughout the operating cycle until the user changes the mode manually or restarts the unit.
- c) Should the T_{i1} sensor fail or be damaged, auto mode will not function.

With Electric Heater as Primary Heat Source

- a) If the current running mode is AUTO COOL mode, it will change over to AUTO HEAT mode upon satisfying all the conditions below:
 - i. $T_s - T_r \geq 1^\circ\text{C}$ (or -4°C if economy contact is activated).
 - ii. MTV1 has stopped ≥ 10 minutes.
- b) If the current running mode is AUTO HEAT mode, it will change over to AUTO COOL mode upon satisfying all the conditions below:
 - i. $T_r - T_s \geq 1^\circ\text{C}$ (or $+4^\circ\text{C}$ if economy contact is activated).
 - ii. MTV1 has stopped ≥ 10 minutes.

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

D.4.2. Without Thermoelectric Valve Configuration

COOL MODE

- a) Heater, AUX1, MTV1 and MTV2 are always off.
- b) If $T_r \geq T_s + 1^\circ\text{C}$ (or $+ 4^\circ\text{C}$ if economy contact is activated), then cool operation is activated and AUX2 is turned on. Indoor fan runs at set speed.
- c) If $T_r < T_s$, then cool operation is terminated and AUX2 is off. Indoor fan runs at Modbus 310000 setting.
- d) The range of T_s is $16 - 30^\circ\text{C}$.
- e) Indoor fan speed can be adjusted to low, medium, high and auto.
- f) When the unit is turned off, indoor fan shut down after 5 seconds.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

- a) If $T_{i1} \leq 2^\circ\text{C}$ for 2 minutes, then AUX2 is turned off. If low speed is selected via user interface, then indoor fan runs at medium speed. If medium or high speed is selected via user interface, then indoor fan runs at set speed.
- b) If $T_{i1} \geq 5^\circ\text{C}$ for 2 minutes, then AUX2 is turned 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 to low, medium and high.

HEAT MODE

Without electrical heater

- a) MTV1, MTV2, AUX2 and heater are always off.
- b) If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and AUX1 is turned on. Indoor fan runs at the set speed.
- c) If $T_r > T_s$, then heat operation is terminated and AUX1 is turned off. Indoor fan runs at Modbus 310000 setting.
- d) The range of T_s is $16 - 30^\circ\text{C}$.
- e) Indoor fan speed can be adjusted to low, medium, high and auto.

With electrical heater as booster

- a) MTV1, MTV2 and AUX2 are always off.
- b) If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and AUX1 is turned on. Indoor fan runs at the set speed.
- c) If $T_r > T_s$, then heat operation is terminated and AUX1 is turned off. Indoor fan runs at Modbus 310000 setting.
- d) If $T_{i1} < 40^\circ\text{C}$, then the electrical heater is turned on. If $40^\circ\text{C} \leq T_{i1} < 45^\circ\text{C}$, then the electrical heater maintains its original state. If $T_{i1} \geq 45^\circ\text{C}$, then the electrical heater is turned off.
- e) The range of T_s is $16 - 30^\circ\text{C}$.
- f) Indoor fan speed can be adjusted to low, medium, high and auto.

PRE-HEATWithout Electrical Heater

- a) MTV1, MTV2 and AUX2 are off.
- b) If $Ti1 < 36^{\circ}\text{C}$ (or $> 28^{\circ}\text{C}$ is selected by DIPB-S2 position SW4), then AUX1 is turned on while indoor fan remains off.
- c) If $Ti1 \geq 38^{\circ}\text{C}$ (or $< 30^{\circ}\text{C}$ is selected by DIPB-S2 position SW4), then AUX1 is turned on while indoor fan runs at set speed.
- d) If the indoor coil temperature sensor is damaged, then the pre-heat time is set for 2 minutes and the indoor fan runs at set speed.

With Electrical Heater

- a) If the indoor fan speed \geq Modbus 310000 setting, then the electrical heater will turn on.

POST-HEATWith and Without Electrical Heater

- a) AUX1 is turned off. Electrical heater is turned off.
- b) Indoor fan will shut down after the unit has been turned off for 20 seconds for 30 seconds, then shuts off.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

- a) If $Ti1 \leq 2^{\circ}\text{C}$ for 2 minutes, then AUX2 is turned off. If indoor fan runs at low speed, then it will run at medium speed. If indoor fan runs at medium or high speed, then it will run at set speed.
- b) If $Ti1 \geq 5^{\circ}\text{C}$ for 2 minutes, then AUX2 is turned on. Indoor fan runs at set speed.

OVER-HEAT PROTECTION OF INDOOR COIL

- a) If $Ti1 \geq 75^{\circ}\text{C}$, then AUX1 is turned off. Indoor fan remains on and runs at high speed.
- b) If $Ti1 < 70^{\circ}\text{C}$, then AUX1 is turned on. Indoor fan remains and runs at set speed.
- c) If the indoor coil temperature sensor is damaged, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

DEHUMIDIFICATION MODE

- a) MTV1, MTV2, AUX1 and heater are always off.
- b) If $Tr \geq 25^{\circ}\text{C}$, then the indoor fan and AUX2 will be turned on for 3 minutes, and then off for 4 minutes.
- c) If $16^{\circ}\text{C} \leq Tr < 25^{\circ}\text{C}$, then the indoor fan and AUX2 will be turned on for 3 minutes, and then off for 6 minutes.
- d) If $Tr < 16^{\circ}\text{C}$, then the indoor fan and AUX2 will be turned off for 4 minutes.
- e) At the end of the above dehumidification cycle, the system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process.

AUTO-MODE

Not available.

D.5. Control Logics For 4-Pipe System

Note: unit equipped with 4x2 switching device.

COOL MODE

- a) MTV2, AUX1 and Electrical Heater are always off.
- b) If $T_r \geq T_s + 1^\circ\text{C}$ (or $+ 4^\circ\text{C}$ if economy contact is activated), then cool operation is activated, MTV1 and AUX2 are turned on. Indoor fan runs at set speed.
- c) If $T_r < T_s$, then cool operation is terminated, MTV1 and AUX2 are turned off. Indoor fan runs at set speed.
- d) The range of T_s is $16 - 30^\circ\text{C}$
- e) Indoor fan speed can be adjusted to 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, the indoor fan will shut down after 5 seconds.

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 to low, medium and high.

HEAT MODE

Without Electrical Heater

- a) MTV1, AUX2 and electric heater are always off.
- b) If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and MTV2 and AUX1 are turned on. Indoor fan runs at the set speed.
- c) If $T_r > T_s$, then heat operation is terminated and MTV2 and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.
- d) The range of T_s is $16 - 30^\circ\text{C}$.
- e) Indoor fan speed can be adjusted to low, medium, high and auto.
- f) When turned on, MTV2 requires 30 seconds before it is fully open.
- g) When turned off, MTV2 requires 120 seconds before it is fully closed.

With Electrical Heater as Booster

- a) MTV1 and AUX2 are always off.
- b) If $T_r \leq T_s - 1^\circ\text{C}$ (or $- 4^\circ\text{C}$ if economy contact is activated), then heat operation is activated and MTV2 and AUX1 are turned on. Indoor fan runs at the set speed.
- c) If $T_r > T_s$, then heat operation is terminated and MTV2 and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.
- d) If $T_{i2} < 40^\circ\text{C}$, then the electrical heater is turned on. If $40^\circ\text{C} \leq T_{i2} < 45^\circ\text{C}$, then the electrical heater maintain its original state. If $T_{i2} \geq 45^\circ\text{C}$, then the electrical heater is turned off.
- e) The range of T_s is $16 - 30^\circ\text{C}$.
- f) Indoor fan speed can be adjusted to low, medium, high and auto.
- g) When turned on, MTV2 requires 30 seconds before it is fully open.
- h) When turned off, MTV2 requires 120 seconds before it is fully closed.

PRE-HEAT

Without Electrical Heater

- a) If $T_{i2} < 36^\circ\text{C}$ [or 28°C depending on DIP setting], then MTV2 and AUX1 are turned on. Indoor fan runs at 200RPM.
- b) If $T_{i2} \geq 38^\circ\text{C}$ [or 30°C depending on DIP setting], then MTV2 and AUX1 are turned on. Indoor fan runs at set speed.
- c) If indoor coil temperature sensor is damaged, then the pre-heat time is set for 2 minutes. Indoor fan runs at set speed.

Pre-heat with Electrical Heater

- a) MTV2 and AUX1 are turned on.
- b) If the indoor fan speed $\geq 300\text{RPM}$, then the electrical heater will turn on.

POST-HEATWithout Electrical Heater

- a) If $T_{i2} \geq 38^{\circ}\text{C}$, then MTV2 and AUX 1 are turned off. Indoor fan continues to run at set speed.
- b) If $36^{\circ}\text{F} \leq T_{i2} \leq 38^{\circ}\text{F}$, then MTV2 and AUX1 are turned off. Indoor fan maintain its original state.
- c) If $T_{i2} < 36^{\circ}\text{C}$, then MTV2 and AUX1 are turned off. Indoor fan runs at Modbus 310000 setting.
- d) If the indoor coil temperature sensor is damaged, then the post-heat time is set for 3 minutes. Indoor fan running at set speed.

With Electrical Heater

- a) Indoor fan runs at 200RPM after the unit has been turned off for 20 seconds for 30 seconds, then shuts off.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

- a) If $T_{i1} \leq 2^{\circ}\text{C}$ for 2 minutes, then MTV1 and AUX2 are turned off. If indoor fan is set for low speed, then it will run at medium speed. If it is set at medium or high speed, then it will keep running at the same speed.
- b) If $T_{i1} \geq 5^{\circ}\text{C}$ for 2 minutes, then MTV1 and AUX2 are turned on. Indoor fan runs at set speed.

OVER HEAT PROTECTION OF INDOOR COIL

- a) If $T_{i2} \geq 75^{\circ}\text{C}$, then MTV2 and AUX1 are turned off. Indoor fan remains on and runs at high speed.
- b) If $T_{i2} < 70^{\circ}\text{C}$, then MTV2 and AUX1 are turned on. Indoor fan remains on and runs at set speed.
- c) If the indoor coil temperature sensor is damaged, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat set times.

DEHUMIDIFICATION MODE

- a) MTV2, AUX1 and heater are always off.
- b) If $T_r \geq 25^{\circ}\text{C}$, then MTV1 and AUX2 will be turned on for 3 minutes, and then off for 4 minutes.
- c) If $16^{\circ}\text{C} \leq T_r < 25^{\circ}\text{C}$, then MTV1 and AUX2 will be turned on for 3 minutes, and then off for 6 minutes.
- d) If $T_r < 16^{\circ}\text{C}$, then MTV1 and AUX2 will be turned off for 4 minutes.
- e) At the end of the above dehumidification cycle, the system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process.

AUTO-MODE

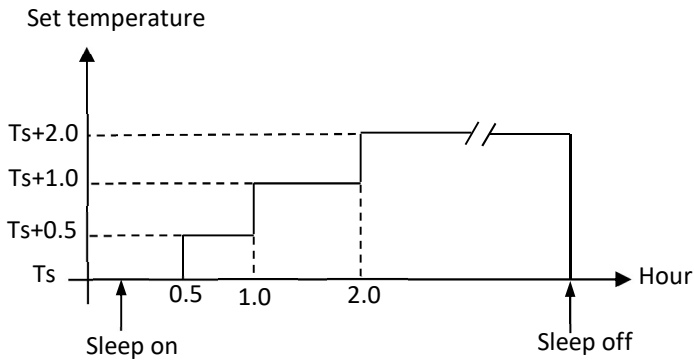
- a) If the current running mode is AUTO COOL mode, it will change over to AUTO HEAT mode upon satisfying all the conditions below:
 - i. $T_s - T_r \geq 1^{\circ}\text{C}$ (or -4°C if economy contact is activated).
 - ii. MTV1 has stopped ≥ 10 minutes.
- b) If the current running mode is AUTO HEAT mode, it will change over to AUTO COOL mode upon satisfying all the conditions below:
 - i. $T_r - T_s \geq 1^{\circ}\text{C}$ (or $+4^{\circ}\text{C}$ if economy contact is activated).
 - ii. MTV2 has stopped ≥ 10 minutes.

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

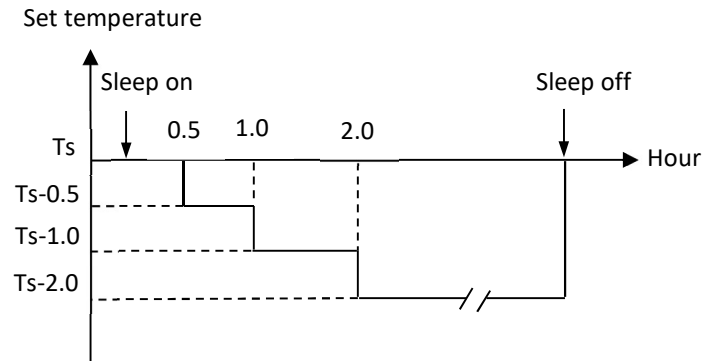
D.6. Sleep Mode

- SLEEP mode can only be set when the unit is in COOL or HEAT mode.
- In COOL mode, after SLEEP mode is set, the indoor fan will run at low speed and T_s will increase by 2°C over 2 hours.
- In HEAT mode, after SLEEP mode is set, the indoor fan will run at set speed and T_s will decrease by 2°C over 2 hours.
- Changing of operation mode will cancel SLEEP mode.

The cool mode sleep profile is:



The heat mode sleep profile is:



D.7. Auto Fan Speed

- In COOL mode, the fan speed cannot change until it has run for more than 30 seconds.
- In HEAT mode, the fan speed cannot change until it has run for more than 30 seconds.

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 5 VDC by PID calculation every 10 seconds. The air flow is adjusted from 15% to 100%.

D.8. Louver

For remote handset

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

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

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

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

For wired wall pad

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

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

D.9. Buzzer

If a command from remote handset is received by the fan coil unit, the fan coil unit will respond with beep sound. If a command is received by the fan coil units in master-slave connection, the master unit will respond with 2 beeps for each setting, while 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. When power supply resumes or the system is switched on again, the same operations as previously set will function.

Operation parameters

- When using a handset, parameters are Mode, Set Temperature, Swing, and Fan Speed
- When using a wall pad, parameters are Mode, Set Temperature, Swing, and Fan Speed, as well as the 7-day ON/OFF Timer program.

D.11. On/Off Switch

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

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

D.12. Electric Heater Safety Switch

- Before the electrical heater is turned on, the EH safety switch must be closed and EC motor RPM must be more than 500RPM.
- When electrical heater is ON, electrical heater safety switch is opened for ≥ 1 second or EC motor RPM is lower than Modbus 310000 setting, EH will be turned off immediately and report an error and fan speed is changed to high speed.
- Once the contact is returned to the closed ≥ 180 seconds, reset the error and the heater will start again.
- When the EH safety switch is opened ≥ 3 times within 60 minutes the heater is not allowed to start anymore.
- Turn off the unit to reset the fault, provided that the switch has returned to the closed position.

D.13. Low Temperature Protection of Indoor Coil in Winter

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

If Unit with SW2=0 (2-pipe system), is in Standby Mode

If Tr ≤ 2 °C for 2 minutes

1. MTV1 is turned ON,
2. AUX1 is closed,
3. If Ti1 < 5°C for 2 minutes EH (if present) is switched on
4. Indoor fan is turned on at low speed.

If Tr ≥ 5 °C for 2 minutes

1. MTV1 is turned OFF,
2. AUX1 is open,
3. Electric Heater is turned Off
4. Indoor fan Switched OFF.

If Unit with SW2=1(4-pipe system), is in Standby Mode

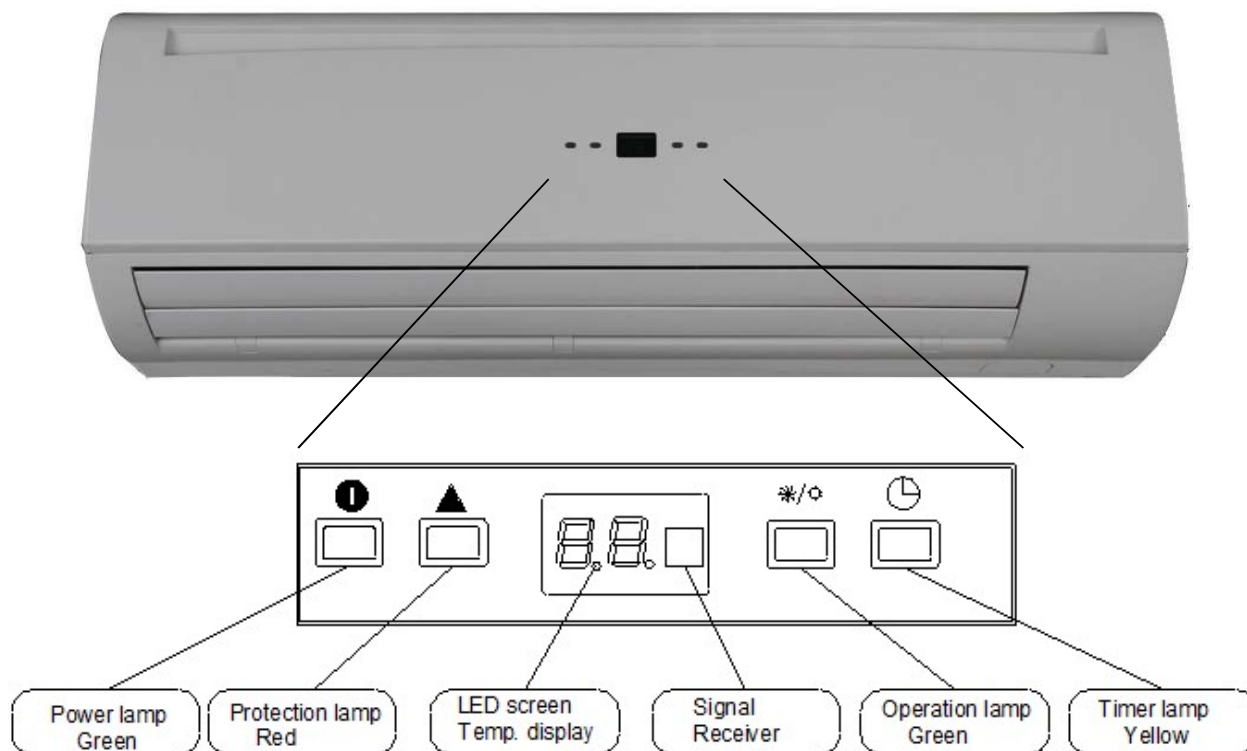
If Tr ≤ 2 °C for 2 minutes

1. MTV2 is turned ON,
2. AUX1 is closed,
3. If Ti2 < 5°C for 2 minutes EH (if present) is switched on
4. Indoor fan is turned on at low speed.

If Tr ≥ 5 °C for 2 minutes

1. MTV2 is OFF,
2. AUX1 is open,
3. Electric Heater is turned Off
4. Indoor fan Switched OFF.

D.14. LED Display and Error Description



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

For all units - Operation LED light (Green)				
Error Description	Blink	LED Display	Reason	Remedy
Electrical heater failure	Green LED blinks 1 times, stops for 3s	E1	<i>Only for unit with EH.</i> EH safety switch is open.	1. Change fan speed to high. 2. Replace the damaged EH safety switch.
Indoor coil sensor 2 failure	Green LED blinks 2 times, stops for 3s	E2	Ti2 sensor unplugged or damaged.	1. Check if Ti2 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Return air sensor failure	Green LED blinks 3 times, stops for 3s	E3	Room sensor unplugged or damaged.	1. Check if Tr plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil sensor 1 failure	Green LED blinks 4 times, stops for 3s	E4	Ti1 sensor unplugged or damaged.	1. Check if Ti1 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil low temperature protection	Green LED blinks 5 times, stops for 3s	E5	Water temperature is lower than 3°C.	Check the water temperature.
Indoor coil over heat protection	Green LED blinks 6 times, stops for 3s	E6	Water temperature is higher than 70°C.	Check the water temperature
EC motor failure	Green LED blinks 9 times, stops for 3s	E9	No EC motor feedback	1. Check DIPB-SW5 and SW6 setting. 2. Check the EC motor.
Anti-frozen protection	Green LED blinks 11 times, stops for 3s	E11	When unit is standby, Tr<2°C.	1. Turn on unit to keep Tr higher than 5°C

D.15. LED Display on Master/Slave Connection

The error message indicating the defect status of all slave units will be shown in LED lights on the master unit.

Master unit Protection LED light (Red)		
Unit No.	Blink	Remedy
Unit 2 failure	RED LED blinks 2 times, stops for 3s	Check unit 2 communication plug and fix it
Unit 3 failure	RED LED blinks 3 times, stops for 3s	Check unit 3 communication plug and fix it
Unit 4 failure	RED LED blinks 4 times, stops for 3s	Check unit 4 communication plug and fix it
Unit 5 failure	RED LED blinks 5 times, stops for 3s	Check unit 5 communication plug and fix it
Unit 6 failure	RED LED blinks 6 times, stops for 3s	Check unit 6 communication plug and fix it
Unit 7 failure	RED LED blinks 7 times, stops for 3s	Check unit 7 communication plug and fix it
Unit 8 failure	RED LED blinks 8 times, stops for 3s	Check unit 8 communication plug and fix it
Unit 9 failure	RED LED blinks 9 times, stops for 3s	Check unit 9 communication plug and fix it
Unit 10 failure	RED LED blinks 10 times, stops for 3s	Check unit 10 communication plug and fix it
Unit 11 failure	RED LED blinks 11 times, stops for 3s	Check unit 11 communication plug and fix it
Unit 12 failure	RED LED blinks 12 times, stops for 3s	Check unit 12 communication plug and fix it
Unit 13 failure	RED LED blinks 13 times, stops for 3s	Check unit 13 communication plug and fix it
Unit 14 failure	RED LED blinks 14 times, stops for 3s	Check unit 14 communication plug and fix it
Unit 15 failure	RED LED blinks 15 times, stops for 3s	Check unit 15 communication plug and fix it
Unit 16 failure	RED LED blinks 16 times, stops for 3s	Check unit 16 communication plug and fix it
Unit 17 failure	RED LED blinks 17 times, stops for 3s	Check unit 17 communication plug and fix it
Unit 18 failure	RED LED blinks 18 times, stops for 3s	Check unit 18 communication plug and fix it
Unit 19 failure	RED LED blinks 19 times, stops for 3s	Check unit 19 communication plug and fix it
Unit 20 failure	RED LED blinks 20 times, stops for 3s	Check unit 20 communication plug and fix it
Unit 21 failure	RED LED blinks 21 times, stops for 3s	Check unit 21 communication plug and fix it
Unit 22 failure	RED LED blinks 22 times, stops for 3s	Check unit 22 communication plug and fix it
Unit 23 failure	RED LED blinks 23 times, stops for 3s	Check unit 23 communication plug and fix it
Unit 24 failure	RED LED blinks 24 times, stops for 3s	Check unit 24 communication plug and fix it
Unit 25 failure	RED LED blinks 25 times, stops for 3s	Check unit 25 communication plug and fix it
Unit 26 failure	RED LED blinks 26 times, stops for 3s	Check unit 26 communication plug and fix it
Unit 27 failure	RED LED blinks 27 times, stops for 3s	Check unit 27 communication plug and fix it
Unit 28 failure	RED LED blinks 28 times, stops for 3s	Check unit 28 communication plug and fix it
Unit 29 failure	RED LED blinks 29 times, stops for 3s	Check unit 29 communication plug and fix it
Unit 30 failure	RED LED blinks 30 times, stops for 3s	Check unit 30 communication plug and fix it
Unit 31 failure	RED LED blinks 31 times, stops for 3s	Check unit 31 communication plug and fix it
Unit 32 failure	RED LED blinks 32 times, stops for 3s	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 Control Unit Settings

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

Using Remote Control Handset to Set Master Control Unit:

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

Using Wall pad to Set Master Control Unit:

1. Connect all the units PCBs according to the wire color and type of connector.
2. Select the master unit by setting DIPA-S1 SW6 to ON (=1) in the PCB.
3. Ensure the DIPA-S1 SW6 is set to OFF (=0) in the PCB on each slave unit.
4. Provide each slave unit with an addressable code by configuring SW1 – SW5 of DIPA-S1 according to the DIP switch setting table.
5. Switch on the units by connecting the main power supply.
6. 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.
7. Master unit will beep twice confirming receipt of commands while the slave unit will beep once.

E.1.2. Master-Slave Network Setup

1. Disconnect the communication plug from the control box



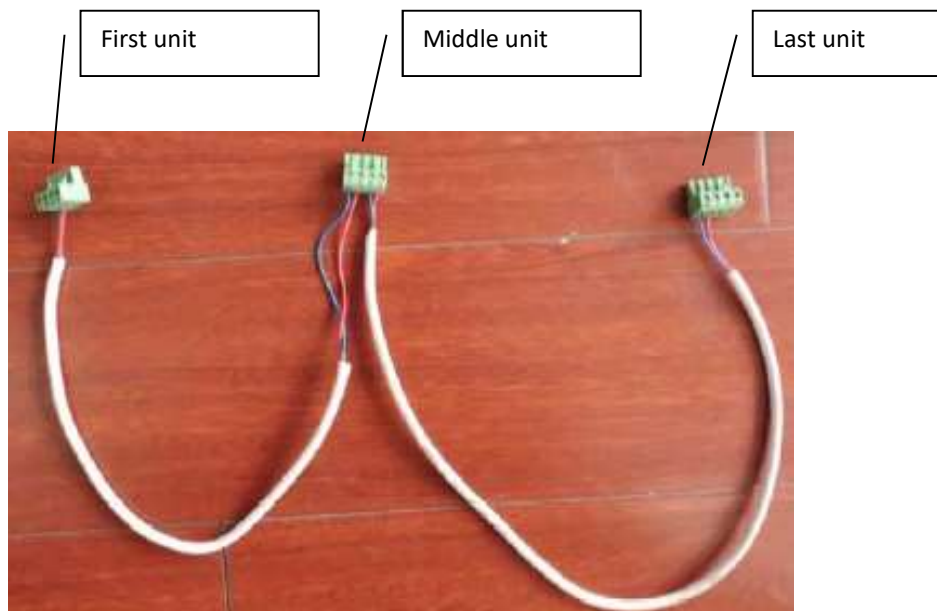
2. Communication plug

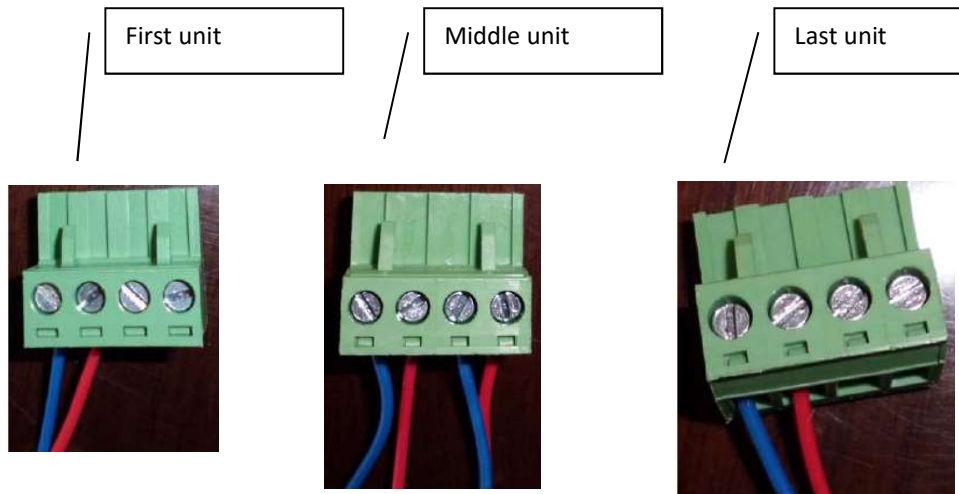
A, B, A, B is printed on the main PCB. When you connect the wires, please ensure connection of A to A and B to B.



3. Connection wire

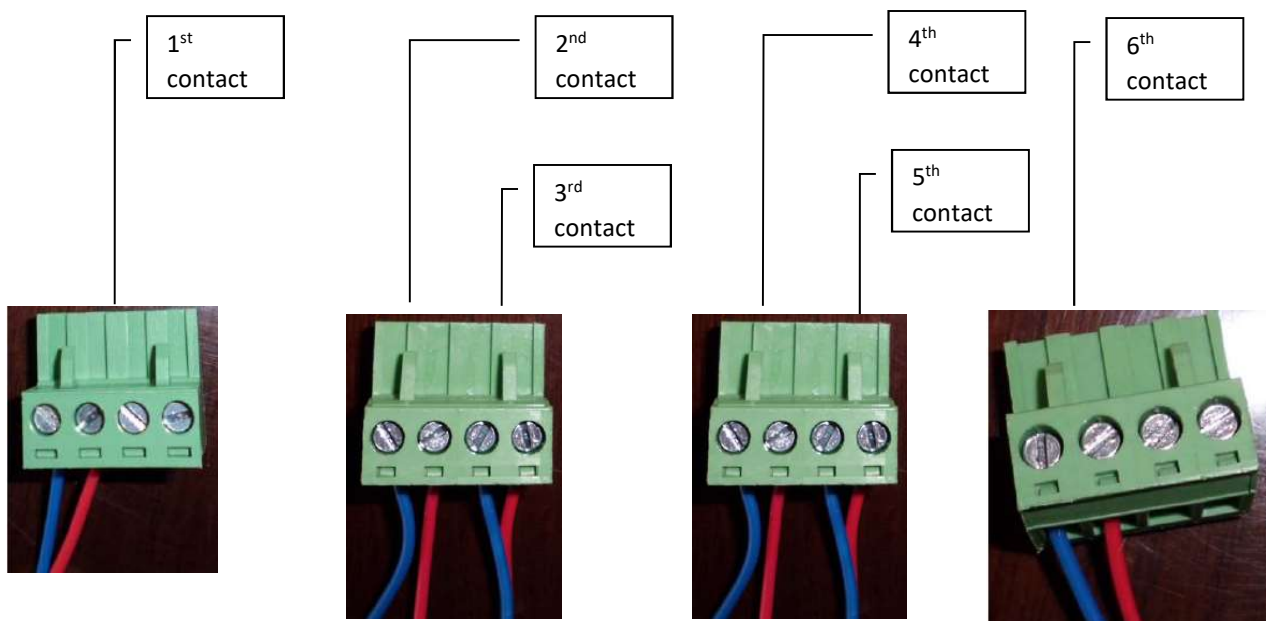
- i. If the total length of wire is more than 1000 m, please use shielded wire in order to protect the signal transmission.
- ii. Complete wire connection





iii. Wire connection check

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



- 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.

4. Reconnect the communication plug to the control box

E.1.3. Master-Slave Communication Method

There are two modes for 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 reception of 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 a master, the addressed slave unit settings will be replaced by the master settings.

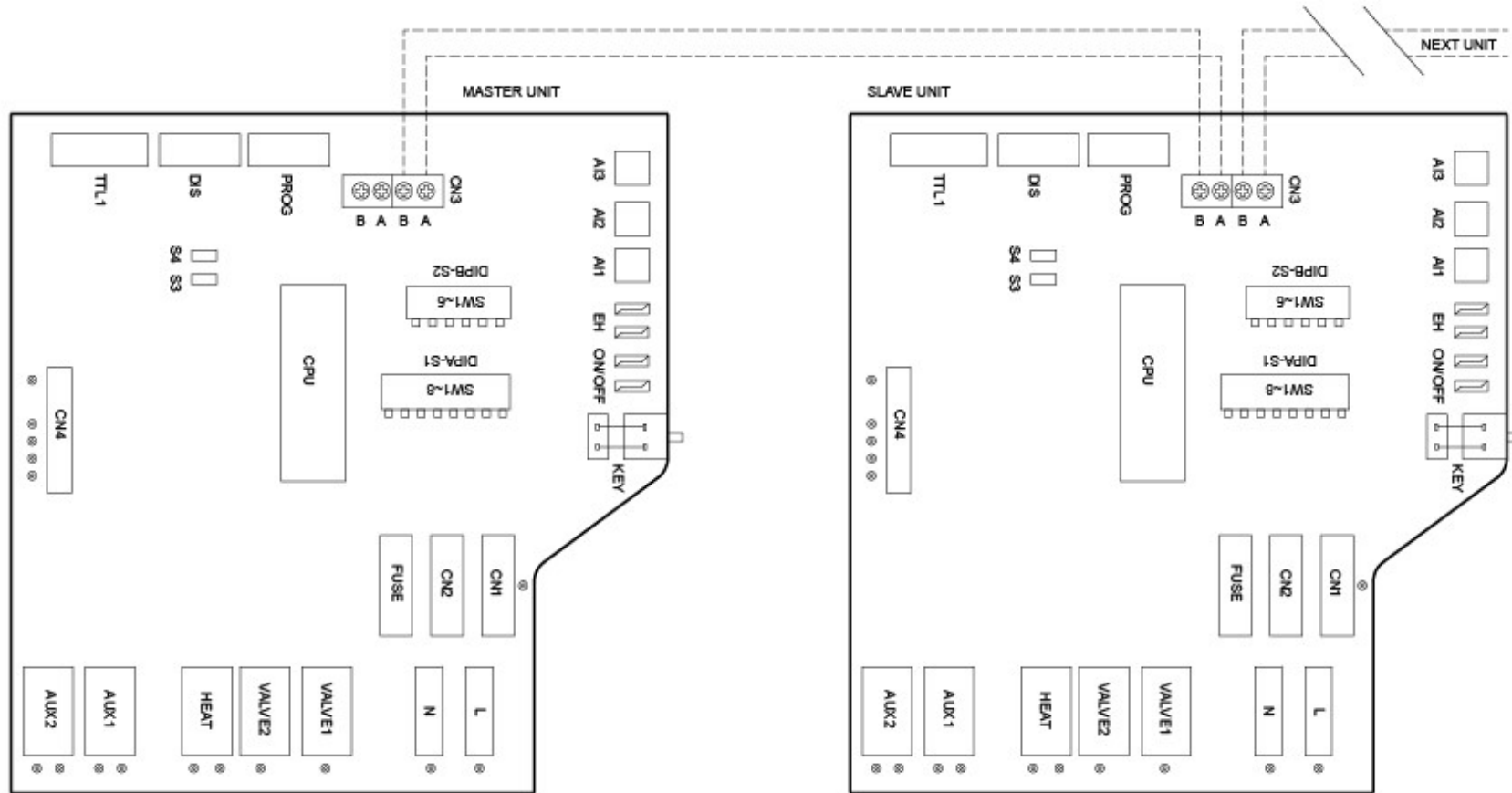
DIPA-S1 address setting: ON=1, OFF=0.

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.

E.1.4. Unit Network Wiring Scheme

Wiring diagram for a master-slave network connection



nt

E.2. Open Modbus Protocol

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

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

Supported Functions:

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

Valid Error code table:

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

Coils table:

Description	Address	Type*	Remark
Unit ON/OFF	100000	R/W	
Sleep mode	100001	R/W	
Louver swing	100002	R/W	
Reserved	100003 to 100015		

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	16~30 degree C (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 = Anti-frozen error 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 Specification: Flexible Function PCB – W Type Control

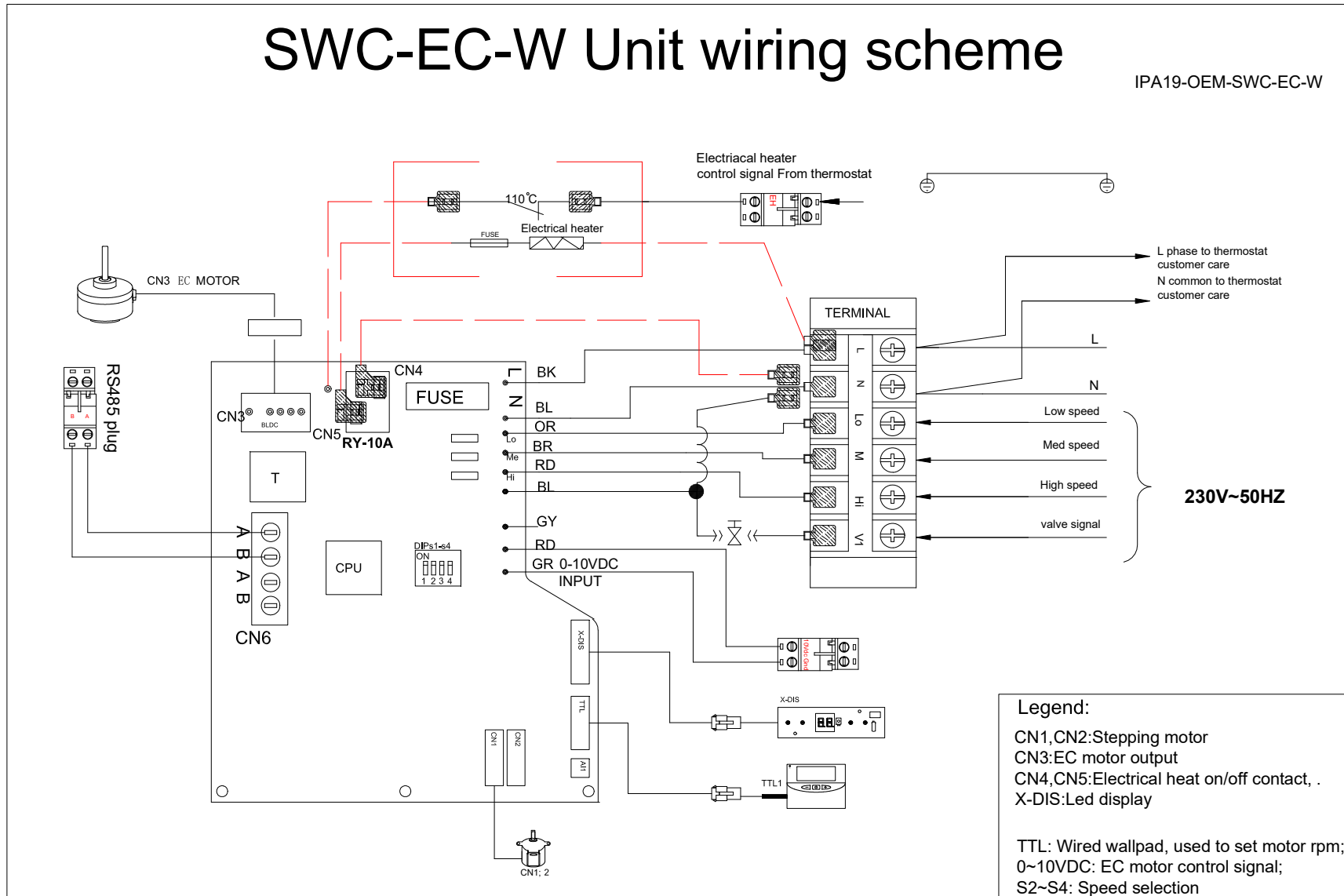
Abbreviation: Ti1 = Chilled water coil temperature

F.1. I/O Port Definitions

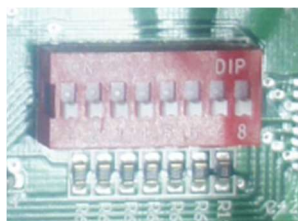
I/O		Code	2-Pipe
Analogue Input	Chilled water Sensor	AI1	Coil sensor (Ti1)
Power input	R1	Lo	230VAC input signals from wired thermostat.
	R2	Med	
	R3	Hi	
	EH	CN4	230VAC input signals from wired thermostat.
Power input	Phase	L	Power supply to the PCB and all the loads connected to the voltage outputs.
	Neutral	N	Power supply to the PCB and all the loads connected to the voltage outputs.
	Earth		Power supply to the PCB and all the loads connected to the voltage outputs.
Digital input	Wired wall pad	TTL	Adjust EC motor RPM
Signal input	0 to+5VDC (0~10VDC)	Signal	0 to +5VDC · SW1=0 (0~10VDC, SW1=1)
Output	EC motor	CN3	EC motor output
	Stepping motor	CN1, CN2	Stepping motor output
	Electric Heater Relay	CN5	When EH signal input is powered on and EC motor RPM>600rpm, EH output is turned on.
	LED Display	X-DIS	LED Display signal

F.2. Wiring diagram

W Type Control PCB



F.3. Onboard configuration



There is 1 DIP switch set on the PCB:

DIPB (8 positions)

- SW1: configured for different modulating signal
- SW2 – SW4: brushless DC fan motor configuration.
- SW5 – SW8: Reserved

Code	State	Description
SW1	0	PCB configured for 0~5VDC modulating signal input.
	1	PCB configured for 0~10VDC modulating signal input.

MODEL	SW2	SW3	SW4	Hi	Med	Low
SWC-04	0	0	0	700	600	500
SWC-06	0	0	1	900	700	600
SWC-12	0	1	0	950	700	600
SWC-15	0	1	1	1100	800	700
SWC-18	1	0	0	1300	1100	900
SWC-20	1	0	1	1100	900	800
SWC-24	1	1	1	1200	1100	900
SWC-30	1	1	0	1350	1200	900
Default RPM	1	1	1	Set by customer requirement		

F.4. Control Logics

1. Power On Setting

When any fan speed is selected, the unit is turned on or modulating signal is more than 2Vdc. When all of the fan speed inputs (H/M/L) are off and modulating signal is less than 2Vdc, the unit is turned off.

2. Alarm Protection and Error Display

a) If EC motor is failure, EH relay is turned OFF at once.

3. Louver

When the unit is turned on, the louver will open to the largest angle at 100°, then move to the operating angle at 87°. When the unit is turned off, the louver will close.

4. Signal Input

When modulating signal input is more than 2 VDC, the units is turned on. EC motor RPM will be changed by the signal voltage.

5. Electrical Heater Operation

After unit is turned on, EH relay will be ON when EH signal is power on and EC motor RPM>300;
If EC motor failure or EC motor RPM is lower than 300RPM, EH relay is turned OFF at once and report error code.

6. Low Temperature Protection of Indoor Coil in Winter

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

Unit is in Standby Mode

If $Ti1 \leq 2 \text{ }^{\circ}\text{C}$ for 2 minutes, report error code and Buzzer is beeping.

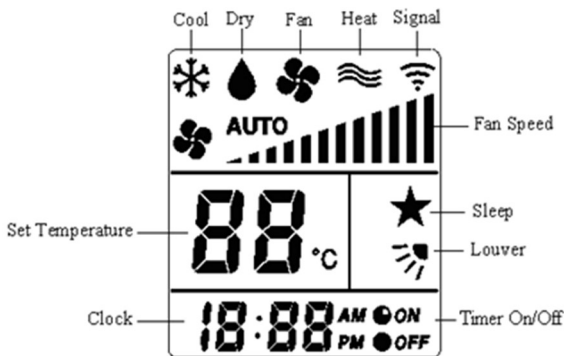
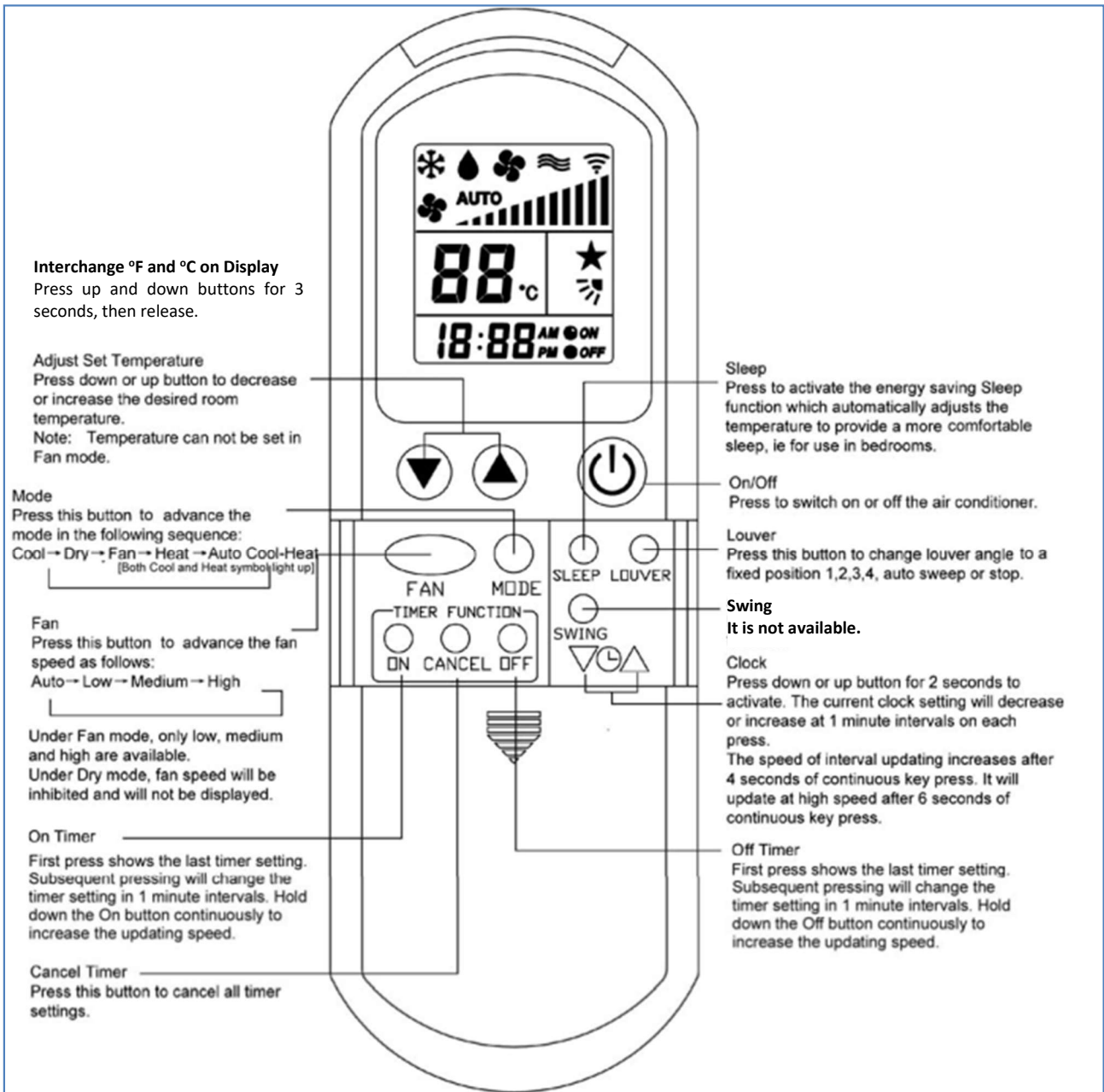
F.5. LED Display and Error Description

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

For all units - Operation LED light (Green)				
Item	Blink	LED Display	Reason	Remedy
Indoor coil sensor 1 failure	Green LED blinks 4 times, stops for 3s	E4	Ti1 sensor connection is unplugged or damaged.	1. Check if Ti1 plug is connected or not. 2. Check if sensor's resistance is correct or not.
EC motor failure	Green LED blinks 9 times, stops for 3s	E9	No EC motor feedback	1. Check if EC motor's wires are connected. 2. Check the EC motor
Anti-frozen	Green LED blinks 11 times, stops for 3s	E11	When unit is standby, $Ti1 < 2^{\circ}\text{C}$.	1. Turn on unit to keep $Ti1$ high than 5°C

G. Users Interface

G.1. Remote Control Handset

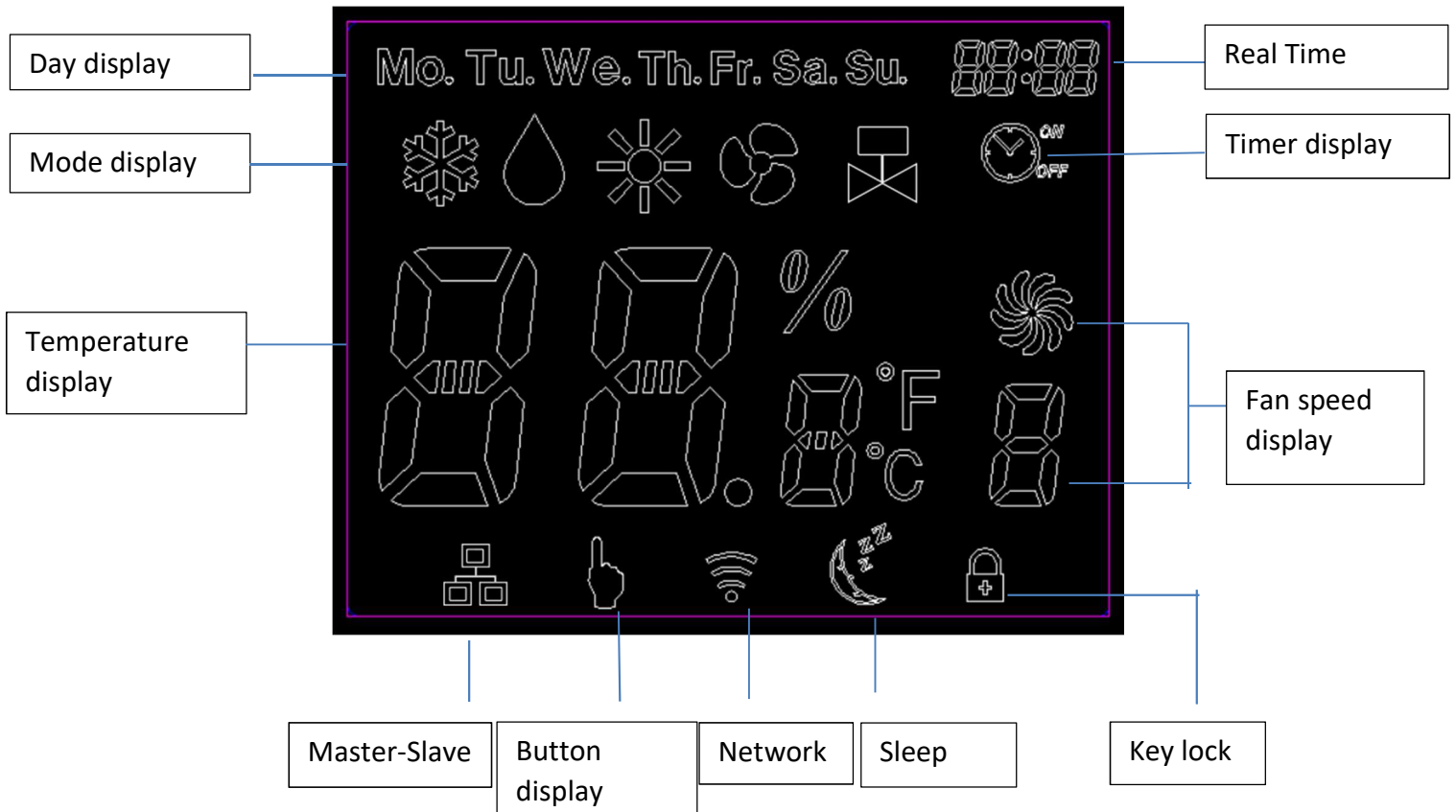


Attention

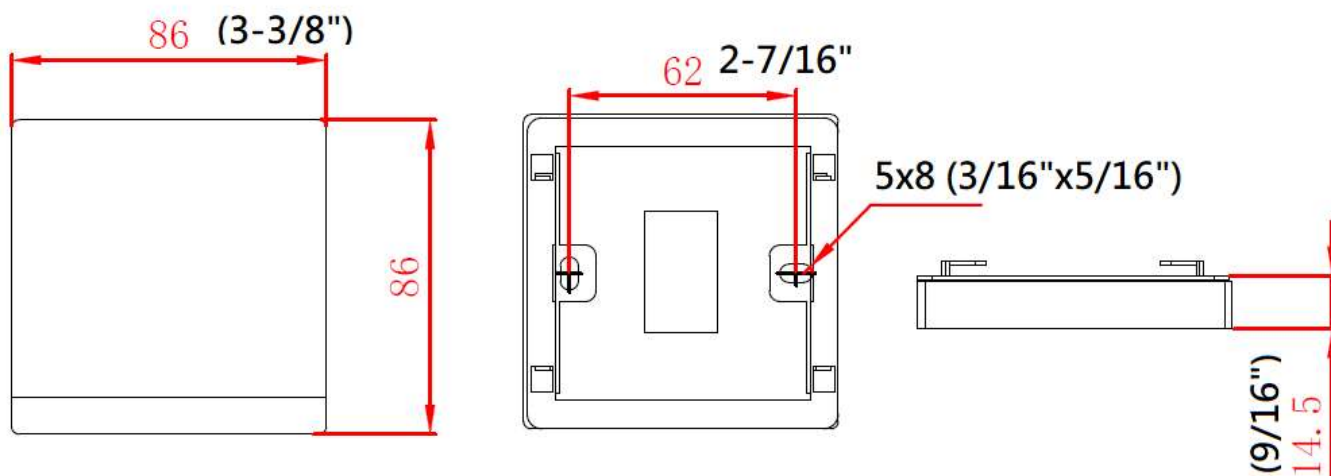
When unit with handset is the master unit, its settings are automatically sent to the slave units; Auto Cool-Heat operation will be applicable in 4-pipe system only.

“Swing” function is not applicable.
European version only uses degree C setting.







G.2. Wired Wall Pad Controller Operation Guide




3. Dimensions




4. Buttons function





Button						
Name	ONOFF	MODE	FAN	SET	DOWN	UP
Function	Switch on or off the unit	Switch between modes	Change Fan Speed	Switch interfaces	Modify parameters	Modify parameters


Press  to change function setting: (CNT stands for pressing times)

- (1) CNT=0 : No function
- (2) CNT=1 : Real time setting
- (3) CNT=2 : Timer On/Off setting
- (4) CNT=3 : Sleep, swing and sensor settings
- (5) CNT=4 : Network control (Single control) mode setting
- (6) CNT=5 : Global control
- (7) CNT=6 : Parameters checking

5. Real time setting




“:” blinks for every second when real time is shown. Press  once to enter Real Time setting interface.



When “:” is on, then press  or  to adjust the current time. Press  to adjust date. Press  to adjust hour or minute.


Press  to confirm settings and exit. If no operation within 6 seconds, it will automatically exit and the setting will not be saved.

6. Time 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  twice to enter Timer setting interface and timer icon is on. When “ON” blinks, press  to set timer date (from Monday to Sunday). Press  to set hour and minute of timer-on or timer-off


alternately. "ON" blinks when timer is set to on and "OFF" blinks when timer is set to off. Press  or  to set timer on/off time.

Press  to confirm settings and exit. If no operation within 6 seconds, it will automatically exit and the setting will not be saved. Timer on/off icon is on when timer on/off is set on that day.



7. Swing, Sleep and Sensor setting


Press  three times to enter Swing or Sleep setting interface and key lock icon blinks.

- Press  to turn the sleep function on or off. Sleep icon is on or off when sleep function is turned on or off.
- Press  to turn on or off the swing function.  is on when swing function is on.
- Press  to set "N" in fan speed display area to activate the wall pad sensor or set "F" in fan speed display area to isolate the wall pad sensor.

Press  to confirm settings and exit. If no operation within 6 seconds, it will automatically exit but will not save settings.

8. Temperature setting

Press  or  to set temperature. Set point temperature is shown on temperature display area.

Press  to confirm settings and exit. If no operation within 6 seconds, it will automatically exit and the setting will not be saved.

When DIP SW1=ON, set point temperature is fixed. In cooling mode, set point temperature is 24°C. In heating mode, set point temperature is 21°C.

When DIP SW1=OFF, temperature can be set from 16°C to 30°C.



When DIP SW2=ON, set point temperature is shown on temperature display area.

When DIP SW2=OFF, room temperature is shown on temperature display area.

9. Mode setting

Press  to set COOL, HEAT, FAN, DRY or AUTO (Display both COOL and HEAT icons) mode alternatively.


10. Key Lock

Press  and  to set key lock function. Key lock icon is on or off when key lock function is set to on or off.



11. Fan speed setting

Press  to set LOW, MEDIUM, HIGH or AUTO speed.


12. ON/OFF setting



Press  to turn on or off the unit.


10. Temperature unit setting


Press  and  at the same time to change temperature unit between Celsius and Fahrenheit.



11. Network control (Only master unit can control slave units)




Press  four times to set network control and “Network” icon is on. The slave unit number is blinking in real time display area.



Press  or  to select slave unit which is online. The offline slave unit number is not shown.



Press  to select parameters: ON/OFF unit, temperature, mode, fan speed, swing and sleep.

Press  to set the selected parameter.


1) ON/OFF unit: Press  button once, “H” blinks in master-slave display area, then press  to turn on unit (“H” blinks) or turn OFF unit (“S” blinks).

2) Temperature: Press  twice, temperature blinks in temperature display area, then press  or  to set temperature.


3) Mode: Press  three times, Mode icon blinks in mode display area, then press  to select mode.


4) FAN SPEED: Press  four times, fan speed icon blinks in fan speed display area, then press  to set fan speed.


5) Sleep: Press  five times, sleep icon blinks then press  to set sleep mode.


Press  to confirm settings and exit. If no operation within 6 seconds, it will automatically exit and the setting will not be saved.

12. Global control setting







Press  five times to set global control and “NETWORK” icon blinks.

1) Press , timer on/off icon blinks and all slave units’ timer on/off function setting are cancelled.

2) Press , all slave units time are set to the same as master units.

Press , master unit sends commands to all online slave units. “NETWORK” icon is off. If timer on/off function is set on mater unit, “NETWORK” icon blinks until Timer on/off disappears.

13. Parameter checking

Press  six times to enter parameter checking interface. Local unit parameter is shown in temperature display area. Unit number is shown in real time hour area and parameter number is shown in real time minute area. For example, 2:03 stands for No.2 unit and No.3 parameter. Press  and  to select the specific parameter. Press  and  to select unit number. Press  to exit parameter checking interface.

Parameters shown below:

Temp. area	Time area
C0	Return air temperature
C1	Indoor coil 1 temperature
C2	DIP switch setting
C3	Indoor coil 2 temperature

14. Error codes

When unit error is detected, unit number blinks on real time hour area and Error code blinks on real time minute area. The Error codes display alternately if more than one error is detected.

If there is no slave unit online, only error code is shown in real time minute area.





Error code table:

Error reason	Error code
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
Water pump faulty	E7
Local communication error	EC0

15. EC motor RPM setting (Not available in AC motor unit)

DIP SW3 is used to set EC motor RPM.

When DIP SW3=ON, wired wall pad enters setting interface. D1/D2/D3 is shown in temperature display area and EC motor RPM is shown in real time display area.

Press  and  to select motor speed (D1, D2 or D3). Press  or  to set EC motor RPM. After 3 seconds, the setting is valid.

When DIP SW3=OFF, wired wall pad resumes normal display.

H. Sensor Resistance R-T Conversion Table

Resistance: $R(25^{\circ}\text{C}) = 10\text{K}\Omega \pm 1\%$

Beta Constant: $B(25/85) = 3977 \pm 1\%$

T (°C)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)	T (°C)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)
-30	174	182.7	191.8	4	26.11	26.9	27.71
-29	163.4	171.5	179.9	5	24.85	25.59	26.34
-28	153.6	161.1	168.9	6	23.65	24.35	25.05
-27	144.4	151.3	158.5	7	22.52	23.17	23.83
-26	135.8	142.2	148.9	8	21.45	22.06	22.68
-25	127.8	133.8	140	9	20.44	21.01	21.59
-24	120.3	125.8	131.6	10	19.48	20.02	20.55
-23	113.3	118.4	123.8	11	18.58	19.7	19.58
-22	106.7	111.5	116.5	12	17.71	18.18	18.65
-21	100.6	105.1	109.7	13	16.9	17.33	17.77
-20	94.9	99.03	103.3	14	16.12	16.53	16.94
-19	89.51	93.39	97.41	15	15.39	15.77	16.16
-18	84.5	88.11	91.85	16	14.69	15.05	15.41
-17	79.8	83.17	86.64	17	14.03	14.37	14.7
-16	75.39	78.53	81.76	18	13.41	13.72	14.03
-15	71.26	74.18	77.19	19	12.81	13.1	13.4
-14	67.37	70.1	72.9	20	12.24	12.52	12.79
-13	63.73	66.26	68.88	21	11.7	11.96	12.22
-12	60.3	62.67	65.1	22	11.19	11.43	11.67
-11	57.08	59.28	61.55	23	10.71	10.93	11.15
-10	54.05	56.1	58.22	24	10.24	10.45	10.66
-9	51.19	53.12	55.08	25	9.8	10	10.2
-8	48.51	50.3	52.14	26	9.374	9.57	9.765
-7	45.98	47.66	49.37	27	8.969	9.16	9.351
-6	43.61	45.17	46.77	28	8.584	8.77	8.957
-5	41.36	42.82	44.31	29	8.218	8.4	8.582
-4	39.25	40.61	42	30	7.869	8.047	8.225
-3	37.26	38.53	39.83	31	7.537	7.71	7.885
-2	35.38	36.56	37.78	32	7.221	7.39	7.56
-1	33.6	34.71	35.85	33	6.92	7.085	7.251
0	31.93	32.97	34.02	34	6.633	6.794	6.956
1	30.35	31.32	32.3	35	6.36	6.517	6.675
2	28.85	29.76	30.68	36	6.099	6.252	6.407
3	27.44	28.29	29.15	37	5.85	6	6.151

Resistance: $R(25^{\circ}\text{C}) = 10\text{K}\Omega \pm 1\%$ Beta Constant: $B(25/85) = 3977 \pm 1\%$

T (°C)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)	T (°C)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)
38	5.614	5.759	5.907	75	1.417	1.474	1.532
39	5.387	5.53	5.673	76	1.37	1.426	1.482
40	5.172	5.31	5.451	77	1.326	1.379	1.434
41	4.966	5.101	5.238	78	1.282	1.335	1.389
42	4.769	4.901	5.034	79	1.241	1.292	1.344
43	4.582	4.71	4.84	80	1.201	1.25	1.302
44	4.402	4.527	4.654	81	1.162	1.211	1.261
45	4.231	4.353	4.477	82	1.125	1.172	1.221
46	4.067	4.186	4.307	83	1.089	1.135	1.183
47	3.911	4.027	4.144	84	1.055	1.1	1.146
48	3.761	3.874	3.989	85	1.021	1.065	1.111
49	3.618	3.728	3.84	86	0.9891	1.032	1.077
50	3.481	3.588	3.697	87	0.9582	1	1.044
51	3.35	3.454	3.561	88	0.9284	0.9697	1.012
52	3.225	3.326	3.43	89	0.8998	0.9401	0.9818
53	3.105	3.204	3.305	90	0.8721	0.9115	0.9522
54	2.99	3.086	3.185	91	0.8455	0.8839	0.9237
55	2.88	2.974	3.07	92	0.8198	0.8573	0.8961
56	2.774	2.866	2.959	93	0.795	0.8316	0.8696
57	2.673	2.762	2.854	94	0.7711	0.8069	0.8439
58	2.576	2.663	2.752	95	0.748	0.783	0.8192
59	2.483	2.568	2.655	96	0.7258	0.7599	0.7953
60	2.394	2.477	2.562	97	0.7043	0.7376	0.7722
61	2.309	2.39	2.472	98	0.6836	0.7161	0.7499
62	2.227	2.306	2.386	99	0.6635	0.6953	0.7283
63	2.149	2.225	2.304	100	0.6442	0.6752	0.7075
64	2.073	2.148	2.224	101	0.6255	0.6558	0.6874
65	2.001	2.074	2.148	102	0.6075	0.6371	0.6679
66	1.931	2.002	2.075	103	0.59	0.619	0.6491
67	1.865	1.934	2.005	104	0.5732	0.6015	0.631
68	1.801	1.868	1.937	105	0.5569	0.5846	0.6134
69	1.739	1.805	1.872				
70	1.68	1.744	1.81				
71	1.623	1.686	1.75				
72	1.569	1.63	1.692				
73	1.516	1.576	1.637				
74	1.466	1.524	1.583				

I. Troubleshooting

