daitsu

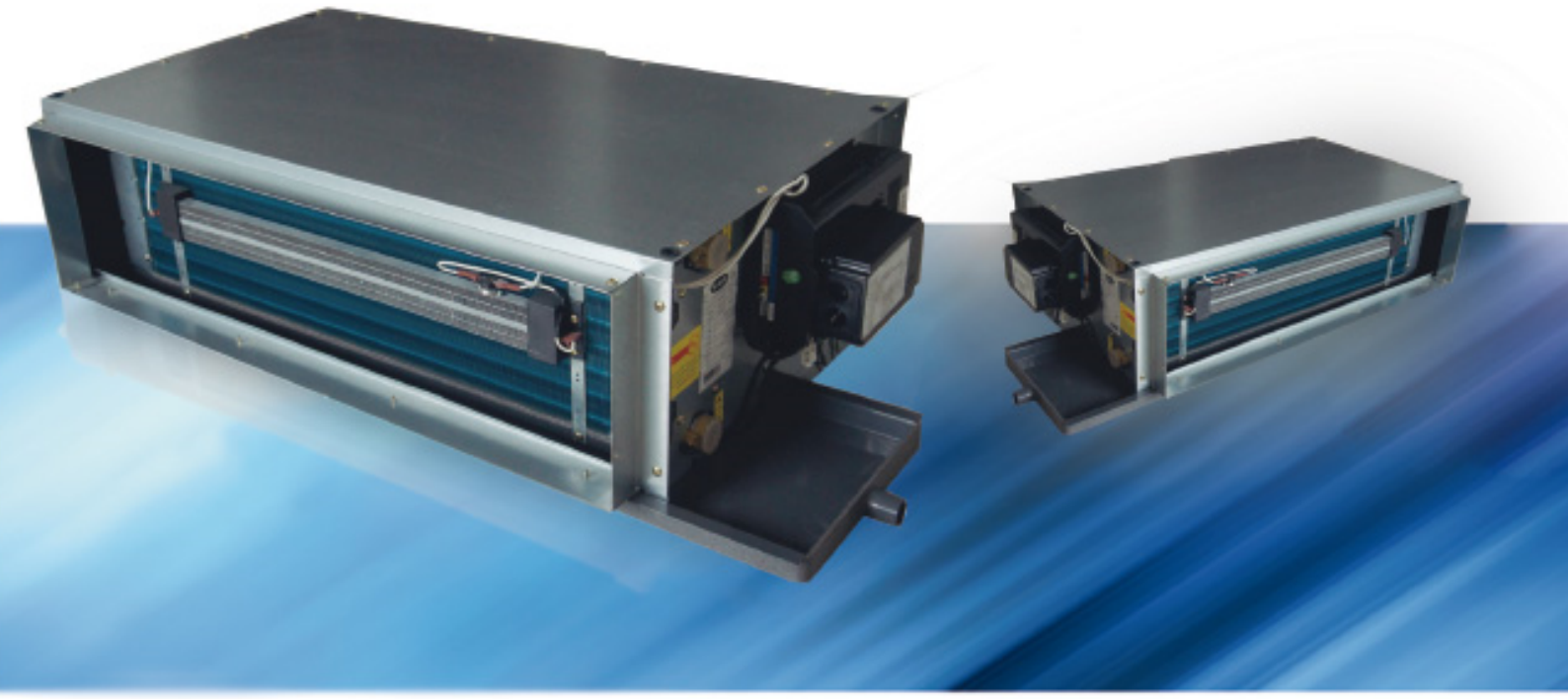
EU50

L-STAT SERIES

INSTALLATION, OPERATION & SERVICE MANUAL

FDLD - / P – AC MOTOR

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



INVESTING IN QUALITY, RELIABILITY & PERFORMANCE.

ISO 9001 QUALITY

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

World Leading Design and Technology

Equipped with the latest air-conditioning test rooms and manufacturing technology, our factories in China and Thailand produce over 2,000,000 air conditioning units each year, all conforming to the highest international standards of quality and safety.

CE SAFETY STANDARDS

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

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.

WEEE MARK

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

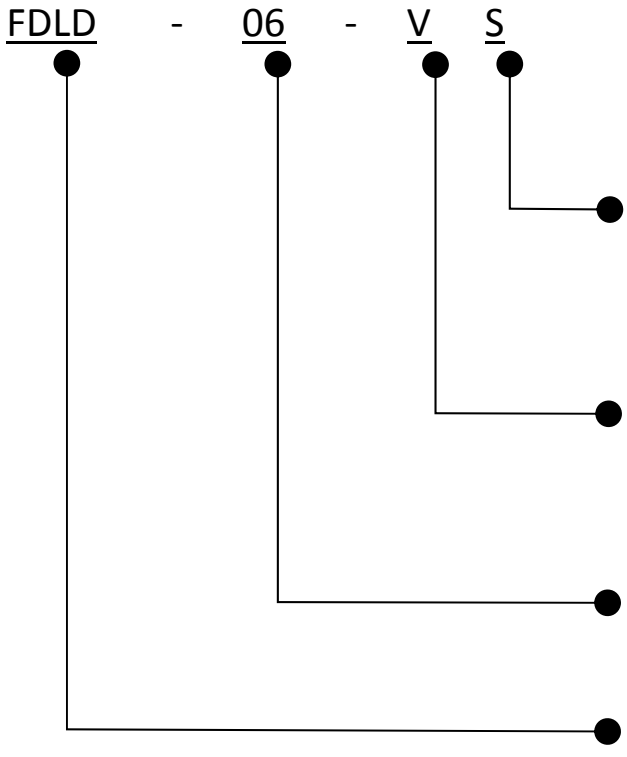
Quality Controlled from Start to Finish

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 full CE certification and ISO 9001, several products have UL / ETL safety approval in the USA and Canada, ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting air conditioning equipment.

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

Table of Content

Model Code Nomenclature



S	Complete function onboard PCB with integrated group control functionality.
T	Terminal strip only.

P	Chilled/Hot Water, 4-Pipe
V	Chilled/Hot Water, 2-Pipe

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

FDLD	Low Static Hydronic Ducted Fan Coil

A. Technical Data

A.1. General Description

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

STRUCTURE
The structure is made from galvanized steel panels with couplings for the connection of ducting and a gravity drain pan for condensation. The insulation is self-extinguishing closed cell expanded polyethylene with thermal and acoustic properties.

HEAT EXCHANGE COIL
The coil is a high heat exchange transfer surface area with aluminum fins mechanically bonded to copper tubes.

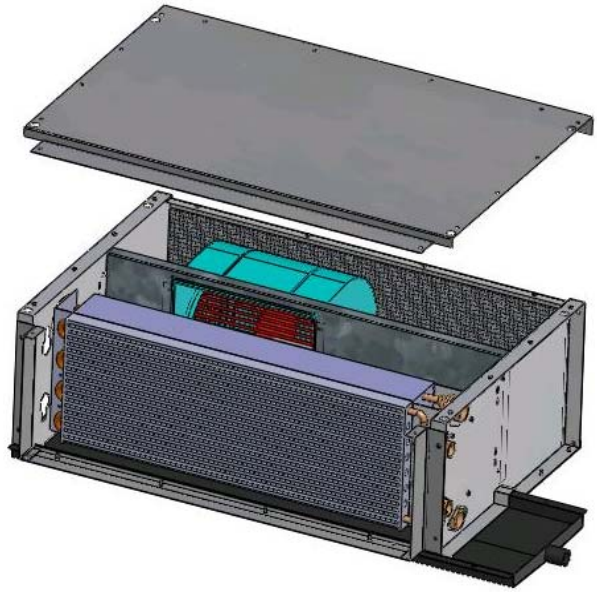
FAN
The 3-Speed centrifugal fan is statically and dynamically balanced.

ELECTRICAL SWITCHBOARD
The electrical switchboard is constructed in accordance with IEC 204-1/EN60204-1, complete with regulator and terminal board for connection to power supply and auxiliary controls.

AIR FILTER
The filter is easily removable and washable and is made from self-extinguishing acrylic with a class EU2 efficiency rating.

DRAIN PAN
The drain pan fits a drain pipe of Ø 21mm (on both left and right side of drain pan) and is heat insulated.

SWITCHBOARD
The unit is equipped with a connection terminal board to control the ventilation speeds.



A.2. General Specification

A.2.1. 3-Row Coil System

Product range: FDLD Low Static Hydronic Ducted Fan Coil

FDLD(3R)-V~ Hydronic Ductable Unit 3-Row Coil 2-Pipe 3-Speed

	FDLD(3R)-[Size]-V~				06	09	12	15	18
Unit Configuration	Configuration				2-pipe				
	Number Of Fan Blowers				Single		Twin		
	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. ~T: Terminal strip only.				
Performance Data – Air	Air Flow[e]	H	3	m^3/hr	306	370	580	797	840
		M	2		260	320	560	700	810
		L	1		210	290	509	570	750
	Available pressure	H	3	Pa	58	60	55	60	58
		M	2		50	50	50	50	50
		L	1		32	39	39	36	41
Performance Data – Cooling	Cooling Capacity[e]	H	3	kW	1.73	2.21	3.1 6	4.26	4.72
		M	2		1.63	1.96	3.06	3.93	4.56
		L	1		1.34	1.7 9	2.79	3.42	4.2
	Sensible Cooling Capacity[e]	H	3		1.24	1.5 8	2.2 8	3.06	3.37
		M	2		1.1 6	1.3 9	2.2 1	2.8 1	3.26
		L	1		0.954	1.27	2.01	2.44	3
	FCEER[e]	Rating			26.94	28.32	35.78	33.6	39.17
		Class			D	D	D	D	D
Performance Data – Heating	Heating Capacity[e]	H	3	kW	2.04	2.5 9	3.77	5 .02	5.55
		M	2		1.91	2.28	3.65	4.62	5.35
		L	1		1.5 7	2.09	3.32	4.01	4.94
	Max. Electric Heater Capacity				1	1.5	2	2	2
	FCCOP[e]	Rating			31.46	32.99	42.52	39.28	46.06
		Class			D	D	C	D	C
Performance Data – Sound	Sound Pressure Level (Outlet)			dB(A)	35/34/32	38/36/34	40/38/36	42/40/39	43/41/40
	Sound Pressure Level (Inlet + Radiated)				38/37/35	41/39/37	43/41/39	45/43/42	46/44/43
	Sound Power Level (Outlet)[e]				49/48/47	52/50/49	55/53/51	57/55/54	58/56/55
	Sound Power Level (Inlet + Radiated)[e]				53/52/51	56/54/53	59/57/55	61/59/58	63/61/60
Performance Data – Electrical	Fan Motor Power[e]	H	3	W	63	75	90	115	120
		M	2		58	68	83	112	117
		L	1		51	64	79	105	107
	Fan Motor Running Current @ H			A	0.29	0.37	0.45	0.57	0.62
	Fan Motor Starting Current @ H			A	0.88	1.1	1.35	1.71	1.85
Performance Data – Hydraulic	Cooling Water Flow Rate		3	L/h	297	379	542	730	809
			2		279	336	525	674	782
			1		230	307	478	586	720
	Cooling Pressure Drop[e]		3	kPa	9.75	15.2	11.4	21.9	27.2
			2		8.76	12.8	10.8	19.1	25.7
			1		6.33	11	9.21	15.1	22.5
	Heating Water Flow Rate @3/2/1			L/h	Same as "Cooling Water Flow Rate"				
	Heating Pressure Drop[e]		3	kPa	7.92	12.7	9.16	17.9	22.4
			2		7	10.3	8.74	15.5	21
			1		5.06	8.86	7.44	12.3	18.4
	Water Content			L	0.66	0.75	1	1.2	1.3
Construction and Packing Data	Water Connections	Type			Socket(Threaded Female)				
		In		mm [in]	19.05[3/4]				
		Out							
	Condensate Drainage Connection								
	Dimensions		L	mm	720	770	920	1070	1120
			W		490				
			H		240				
	Net Weight			kg	17	18	21	24	25

1."*e*" refers to technical information listed on the Eurovent website. Eurovent testing conditions:

a. Cooling mode (2-pipe/4-pipe):

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

b. Heating mode (2-pipe):

- Return air temperature: 20C.
- Inlet water temperature: 50C,
- Water flow: Same as cooling mode

Product range: FDLD Low Static Hydronic Ducted Fan Coil

FDLD(3R)-V~ Hydronic Ductable Unit 3-Row Coil 2-Pipe 3-Speed

		FDLD(3R)-[Size]-V~				24R	30R	36R	40R
Unit Configuration		Configuration				2-pipe			
		Number Of Fan Blowers				Four			
		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. ~T: Terminal strip only.			
Performance Data	Air	Air Flow[e]	H	3	m^3/hr	1148	1545	1575	1880
			M	2		1040	1494	1496	1763
			L	1		960	1370	1384	1700
		Available pressure	H	3	Pa	58	54	55	55
			M	2		50	50	50	50
			L	1		43	44	43	40
	Cooling	Cooling Capacity[e]	H	3	kW	6.04	7.93	8.66	9.7
			M	2		5.63	7.58	8.25	9.2 6
			L	1		5.27	7.18	7.82	8.96
		Sensible Cooling Capacity[e]	H	3		4.41	5.7 8	7.2	6.99
			M	2		4.1	5.5 1	6.86	6.6 6
			L	1		3.81	5.22	6.48	6.44
		FCEER[e]	Rating			35.1	34.4	35.77	32.09
			Class			D	D	D	D
	Heating	Heating Capacity[e]	H	3	kW	7.32	9.57	11.2	11.5
			M	2		6.8	9.12	10.7	11
			L	1		6.35	8.65	10.07	10.6
		Max. Electric Heater Capacity				3	3	3	3
		FCCOP[e]	Rating			42.31	41.38	32.21	37.98
			Class			C	C	D	D
	Sound	Sound Pressure Level (Outlet)			dB(A)	45/44/43	47/46/45	49/48/47	51/49/48
		Sound Pressure Level (Inlet + Radiated)				48/47/46	50/49/48	52/51/50	54/52/51
		Sound Power Level (Outlet)[e]				58/56/55	60/58/57	60/60/58	63/61/59
		Sound Power Level (Inlet + Radiated)[e]				63/61/59	64/62/61	67/65/63	68/66/64
	Electrical	Fan Motor Power[e]	H	3	W	169	221	239	294
			M	2		159	217	223	286
			L	1		151	211	222	281
		Fan Motor Running Current @ H			A	0.73	0.99	0.98	1.39
		Fan Motor Starting Current @ H			A	2.18	2.97	2.95	4.17
	Hydraulic	Cooling Water Flow Rate		3	L/h	1035	1359	1485	1663
				2		965	1299	1414	1587
				1		903	1231	1341	1536
		Cooling Pressure Drop[e]		3	kPa	8.04	14.1	19.07	23.6
				2		7.11	13	17.60	21.7
				1		6.35	12	16.01	20.6
		Heating Water Flow Rate @3/2/1			L/h	Same as "Cooling Water Flow Rate"			
		Heating Pressure Drop[e]		3	kPa	6.5	11.1	11.98	19.4
				2		5.78	10.6	11.02	17.8
				1		5.12	9.73	9.98	16.9
		Water Content			L	1.966	1.966	2.191	2.416
Construction and Packing Data		Water Connections	Type			Socket(Threaded Female)			
			In		mm [in]	19.05[3/4]			
			Out						
		Condensate Drainage Connection							
		Dimensions	L		mm	1620	1620	1770	1920
			W			490			
			H			240			
		Net Weight			kg	38	38	41	44

1."*e*" refers to technical information listed on the Eurovent website. Eurovent testing conditions:

a. Cooling mode (2-pipe/4-pipe):

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

b. Heating mode (2-pipe):

- Return air temperature: 20C.
- Inlet water temperature: 50C.
- Water flow-rate: same as cooling mode.

A.2.2. Auxiliary Heating Coil (1 Row) System

Product range: FDLD Low Static Hydronic Ducted Fan Coil

FDLD(3+1R)-P~ Hydronic Ductable Unit - Auxiliary Heating Coil (1 Row)

Non-standard configuration

		FDLD(3+1R)-[Size]-P~				06	09	12	15	18
Performance Data	Heating	Heating Capacity	H	3	kW	1.85	2.31	3.38	4.46	4.92
			M	2		1.74	2.06	3.28	4.15	4.74
			L	1		1.47	1.91	3.01	3.65	4.42
		FCCOP	Rating			36	29	38	38	35
			Class			D	D	D	D	D
	Hydraulic	Heating Water Flow Rate @3/2/1		3	L/h	159	199	291	385	421
				2		149	177	282	356	407
				1		126	165	259	314	382
		Heating Pressure Drop		3	kPa	5.32	8.39	19.4	36.8	45.8
				2		4.76	6.84	18.4	32.3	42.9
				1		3.54	6.01	15.8	25.7	37.9
		Water Content	Hot water		L	0.22	0.25	0.32	0.40	0.42

		FDLD(3+1R)-[Size]-P~				24R	30R	36R	40R
Performance Data	Heating	Heating Capacity	H	3	kW	6.5	8.39	8.82	10.1
			M	2		6.09	8.04	8.44	9.67
			L	1		5.74	7.66	8.03	9.4
		FCCOP	Rating			42	41	41	38
			Class			C	C	C	D
	Hydraulic	Heating Water Flow Rate @3/2/1		3	L/h	558	720	756	871
				2		522	691	727	832
				1		493	659	691	810
		Heating Pressure Drop		3	kPa	14	24.2	28.9	40.1
				2		12.4	22.4	26.7	36.9
				1		11.2	20.6	24.4	35.1
		Water Content	Hot water		L	0.58	0.66	0.73	0.81

a. Heating mode (4-pipe):

- Return air temperature: 20C.

- Inlet/ Outlet water temperature: 70C/ 60C.

A.2.3. 4-Row Coil System

Product range: FDLD Low Static Hydronic Ducted Fan Coil

FDLD(4R)-V~ Hydronic Ductable Unit 4-Row Coil 2-Pipe 3-Speed

Non-standard configuration

	FDLD(4R)-[Size]-V~				06	09	12	15	18
Unit Configuration	Configuration				2-pipe				
	Number Of Fan Blowers				Single	Twin			
	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. ~T: Terminal strip only.				
Performance Data – Air	Air Flow	H	3	m^3/hr	264	333	494	718	754
		M	2		223	298	485	625	726
		L	1		186	264	446	541	662
	Available pressure	H	3	Pa	58	60	55	60	58
		M	2		50	50	50	50	50
		L	1		32	39	39	36	41
Performance Data – Cooling	Cooling Capacity	H	3	kW	1.78	2.22	3.21	4.62	4.9
		M	2		1.54	2.02	3.16	4.12	4.75
		L	1		1.32	1.82	2.95	3.66	4.39
	Sensible Cooling Capacity	H	3		1.25	1.57	2.28	3.27	3.45
		M	2		1.09	1.42	2.24	2.9	3.35
		L	1		0.925	1.28	2.09	2.57	3.09
	FCEER	Rating			26.24	28.90	37.47	35.74	40.88
		Class			D	D	D	D	C
Performance Data – Heating	Heating Capacity	H	3	kW	2.17	2.7	3.93	5.62	5.93
		M	2		1.87	2.45	3.87	4.99	5.74
		L	1		1.59	2.21	3.6	4.41	5.3
	Max. Electric Heater Capacity				1	1.5	2	2	2
	FCCOP	Rating			31.66	35.00	45.74	43.03	49.40
		Class			D	D	C	C	C
Performance Data – Sound	Sound Pressure Level (Outlet)			dB(A)	35/34/32	38/36/34	40/38/36	42/40/39	43/41/40
	Sound Pressure Level (Inlet + Radiated)				38/37/35	41/39/37	43/41/39	45/43/42	46/44/43
	Sound Power Level (Outlet)				49/48/47	52/50/49	55/53/51	57/55/54	58/56/55
	Sound Power Level (Inlet + Radiated)				53/52/51	56/54/53	59/57/55	61/59/58	63/61/60
Performance Data – Electrical	Fan Motor Power	H	3	W	63	75	90	115	120
		M	2		58	68	83	112	117
		L	1		51	64	79	105	107
	Fan Motor Running Current @ H			A	35/34/32	38/36/34	40/38/36	42/40/39	43/41/40
	Fan Motor Starting Current @ H			A	38/37/35	41/39/37	43/41/39	45/43/42	46/44/43
Performance Data – Hydraulic	Cooling Water Flow Rate		3	L/h	305	381	551	794	841
			2		265	347	542	708	816
			1		227	313	506	628	754
	Cooling Pressure Drop		3	kPa	4.55	7.07	7.17	15.4	17.8
			2		3.59	6.03	6.97	12.7	16.9
			1		1.65	5.06	6.2	10.3	14.8
	Heating Water Flow Rate @3/2/1			L/h	Same as "Cooling Water Flow Rate"				
	Heating Pressure Drop		3	kPa	3.63	5.67	5.77	12.6	14.5
			2		2.85	4.82	5.61	10.3	13.7
			1		2.18	4.03	4.97	8.33	12.0
	Water Content			L	0.88	1	1.28	1.6	1.68
Construction and Packing Data	Water Connections	Type			Socket(Threaded Female)				
		In		mm [in]	19.05[3/4]				
		Out							
	Condensate Drainage Connection								
	Dimensions	L		mm	720	770	920	1070	1120
		W			490				
		H			240				
	Net Weight			kg	17	18	21	24	25

a. Cooling mode (2-pipe/ 4-pipe):

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

b. Heating mode (2-pipe):

- Return air temperature: 20C.
- Inlet water temperature: 50C.
- Water flow-rate: same as cooling mode.

Product range: FDLD Low Static Hydronic Ducted Fan Coil

FDLD(4R)-V~ Hydronic Ductable Unit 4-Row Coil 2-Pipe 3-Speed

Non-standard configuration

		FDLD(4R)-[Size]-V~				24R	30R	36R	40R
Unit Configuration		Configuration				2-pipe			
		Number Of Fan Blowers				Four			
		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. ~T: Terminal strip only.			
Performance Data	Air	Air Flow	H	3	m^3/hr	1026	1431	1518	1791
			M	2		932	1326	1360	1649
			L	1		865	1263	1255	1640
		Available pressure	H	3	Pa	58	54	55	55
			M	2		50	50	50	50
			L	1		43	44	43	40
	Cooling	Cooling Capacity	H	3	kW	6.61	9.0	9.72	11.4
			M	2		6.1	8.45	8.88	10.7
			L	1		5.74	8.11	8.3	10.6
		Sensible Cooling Capacity	H	3		4.68	6.37	6.85	8.04
			M	2		4.31	5.97	6.24	7.49
			L	1		4.04	5.73	5.82	7.46
		FCEER	Rating			38.18	38.71	38.29	37.68
			Class			D	D	D	D
	Heating	Heating Capacity	H	3	kW	8.05	10.9	11.7	13.7
			M	2		7.42	10.3	10.7	12.6
			L	1		6.95	9.83	9.97	12.8
		Max. Electric Heater Capacity				3	3	3	3
		FCCOP	Rating			46.28	46.95	45.89	45.23
			Class			C	C	C	C
	Sound	Sound Pressure Level (Outlet)			dB(A)	45/44/43	47/46/45	49/48/47	51/49/48
		Sound Pressure Level (Inlet + Radiated)				48/47/46	50/49/48	52/51/50	54/52/51
		Sound Power Level (Outlet)				58/56/55	60/58/57	60/60/58	63/61/59
		Sound Power Level (Inlet + Radiated)				63/61/59	64/62/61	67/65/63	68/66/64
	Electrical	Fan Motor Power	H	3	W	169	221	239	294
			M	2		159	217	223	286
			L	1		151	211	222	281
		Fan Motor Running Current @ H			A	0.73	0.99	0.98	1.39
		Fan Motor Starting Current @ H			A	2.18	2.97	2.95	4.17
	Hydraulic	Cooling Water Flow Rate		3	L/h	1135	1544	1669	1963
				2		1048	1451	1524	1550
				1		985	1393	1425	1825
		Cooling Pressure Drop		3	kPa	12.5	23.4	29.2	42.0
				2		10.9	21.0	25.0	37.2
				1		9.82	19.6	22.2	37.0
		Heating Water Flow Rate @3/2/1			L/h	Same as "Cooling Water Flow Rate"			
		Heating Pressure Drop		3	kPa	10.2	19.2	24.0	34.6
				2		8.86	17.2	20.5	22.9
				1		7.95	16.0	18.2	30.4
		Water Content			L	2.32	2.64	2.92	3.24
Construction and Packing Data		Water Connections	Type			Socket(Threaded Female)			
			In		mm [in]	19.05[3/4]			
			Out						
		Condensate Drainage Connection							
		Dimensions	L		mm	1620	1620	1770	1920
			W			490			
			H			240			
		Net Weight			kg	38	38	41	44

a. Cooling mode (2-pipe/ 4-pipe):

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

b. Heating mode (2-pipe):

- Return air temperature: 20C.
- Inlet water temperature: 50C.
- Water flow-rate: same as cooling mode.

A.3. Coil Data

A.3.1. 2-Pipe Systems

Coil data (2-pipe system 3-row)

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

Coil data (2-pipe system 4-row)

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

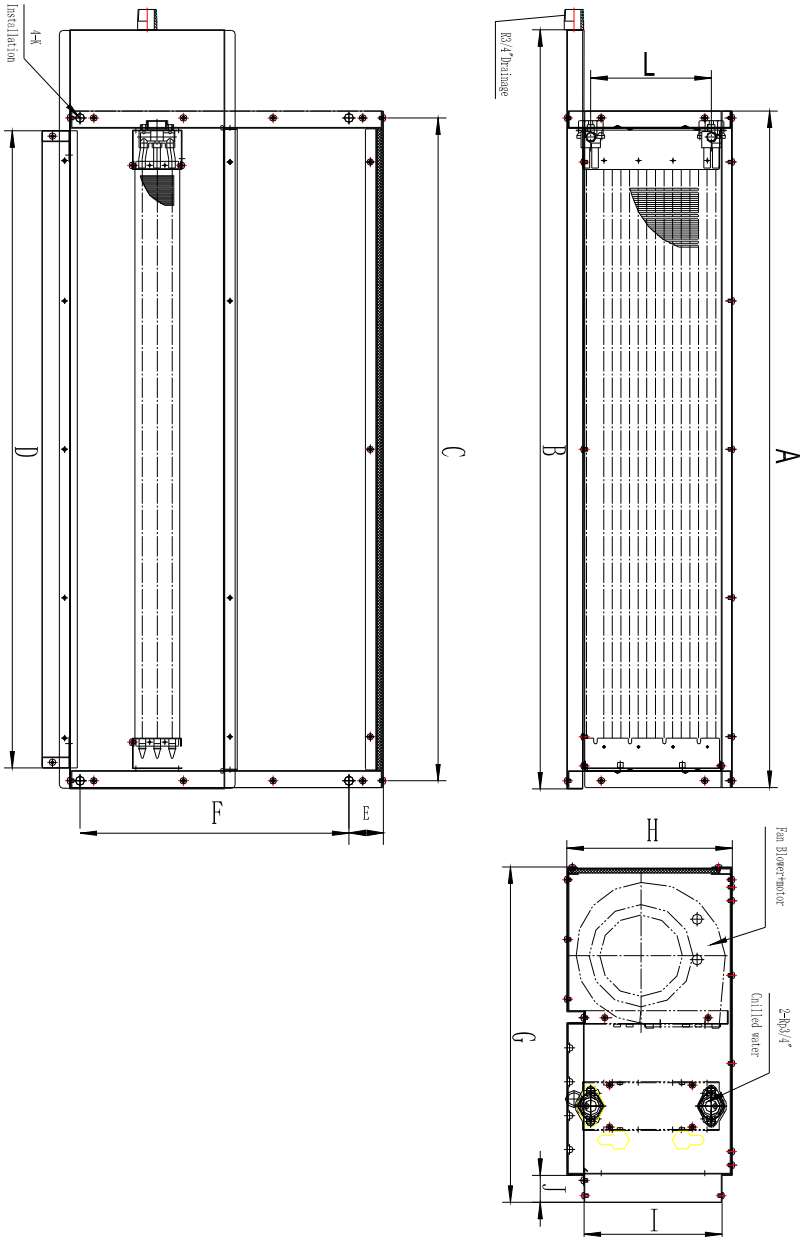
A.3.2. 4-Pipe Systems

Auxiliary heating coil (1-row)

Model	Fin height (mm)	Fin Length (mm)	Fins per Inch	No. of Rows	Fin width (mm)	No. of Circuits	Tube Ø (mm)
FDLD(3+1R)-06	200	441	12.7	1	22	1	9.52
FDLD(3+1R)-09		491					
FDLD(3+1R)-12		641					
FDLD(3+1R)-15		791					
FDLD(3+1R)-18		841					
FDLD(3+1R)-24R		1311				2	
FDLD(3+1R)-30R		1311					
FDLD(3+1R)-36R		1462					
FDLD(3+1R)-40R		1611					

A.4. Dimensional Drawings

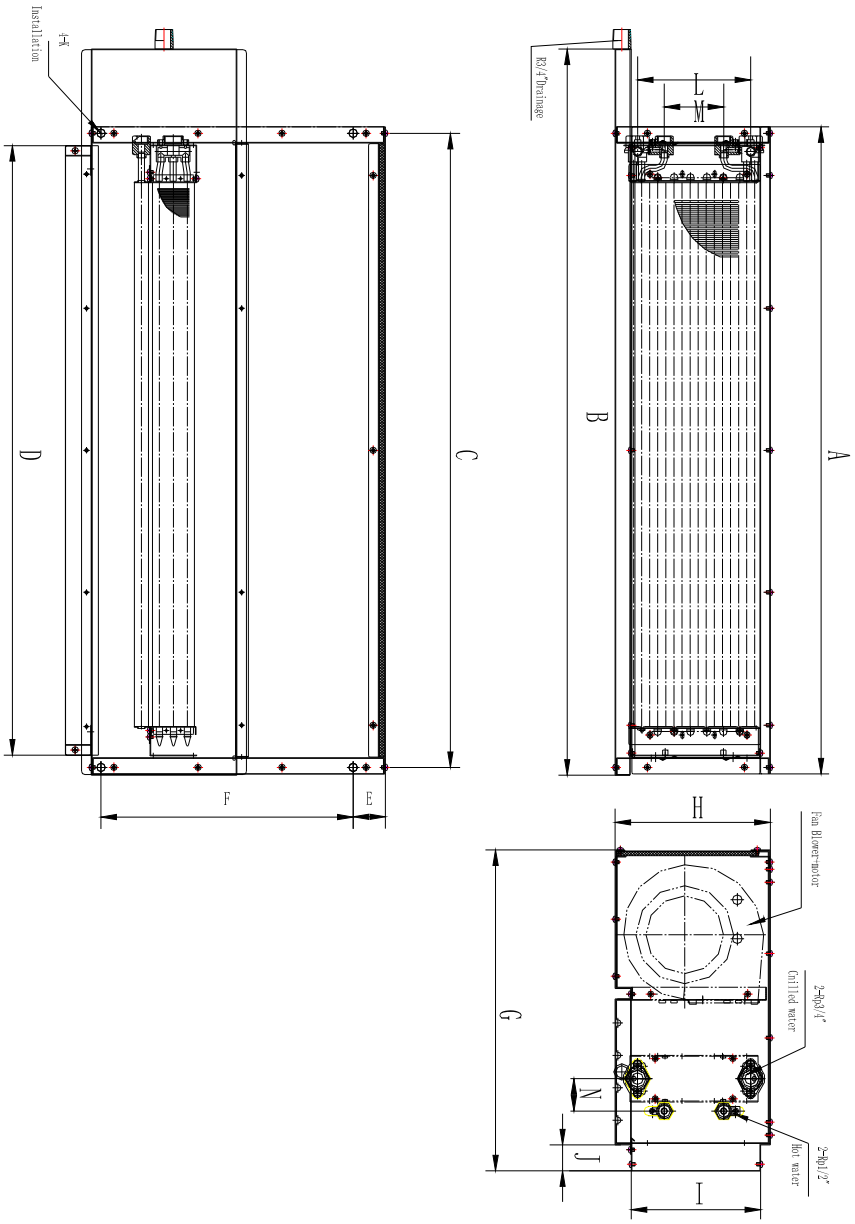
FDLD(3R/4R)-V dimension drawing



Model	A	B	C	D	E	F	G	H	I	J	K	L
FDLD-06-V	598	720	578	540	50	390	495	240	200	40	ϕ14	175
FDLD-09-V	648	770	628	590	50	390	495	240	200	40	ϕ14	175
FDLD-12-V	798	920	778	740	50	390	495	240	200	40	ϕ14	175
FDLD-15-V	948	1070	928	890	50	390	495	240	200	40	ϕ14	175
FDLD-18-V	998	1120	978	940	50	390	495	240	200	40	ϕ14	175
FDLD-24R-V	1498	1620	1478	1440	50	390	495	240	200	40	ϕ14	175
FDLD-30R-V	1498	1620	1478	1440	50	390	495	240	200	40	ϕ14	175
FDLD-36R-V	1648	1770	1628	1590	50	390	495	240	200	40	ϕ14	175
FDLD-40R-V	1798	1920	1778	1740	50	390	495	240	200	40	ϕ14	175

(All dimensions in mm)

FDLD(3R+1)-P dimension drawing

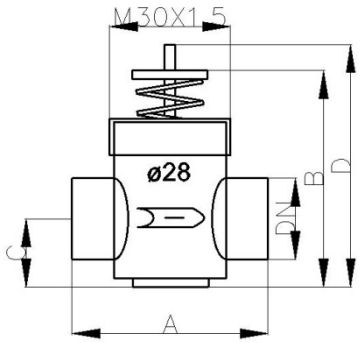


Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N
FDLD-06-P	598	720	578	540	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-09-P	648	770	628	590	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-12-P	798	920	778	740	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-15-P	948	1070	928	890	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-18-P	998	1120	978	940	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-24R-P	1498	1620	1478	1440	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-30R-P	1498	1620	1478	1440	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-36R-P	1648	1770	1628	1590	50	390	495	240	200	40	ϕ14	175	92	50
FDLD-40R-P	1798	1920	1778	1740	50	390	495	240	200	40	ϕ14	175	92	50

(All dimensions in mm)

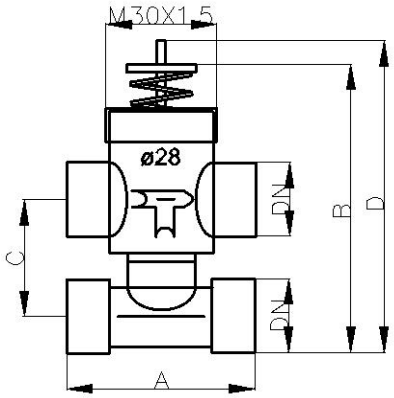
A.5. Valve Information (Optional)

A.5.1. 2-Way 3/4” Valve Body



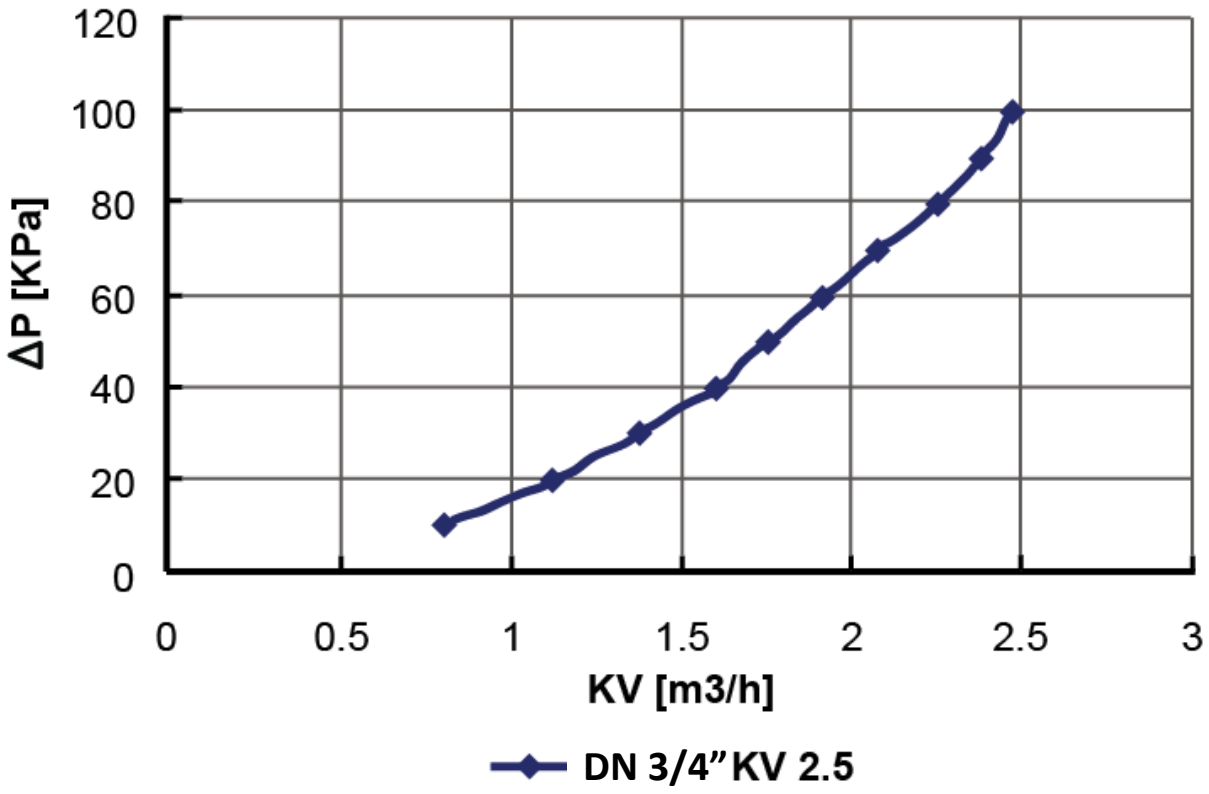
Valve Model	Valve Dimensions (mm)				
	DN	A	B	C	D
SK-DFPS-A-003c	D20 (G3/4”)	56	47	22	63

A.5.2. 3-Way 3/4” Valve Body

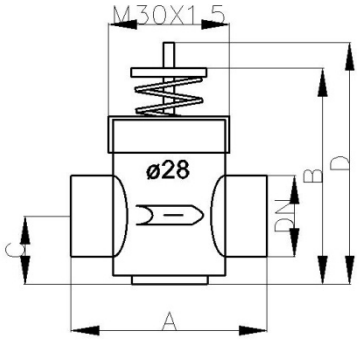


Valve Model	Valve Dimensions (mm)				
	DN	A	B	C	D
SK-DFPS-A-003d	D20 (G3/4”)	56	88	50	104

Differential Pressure Chart

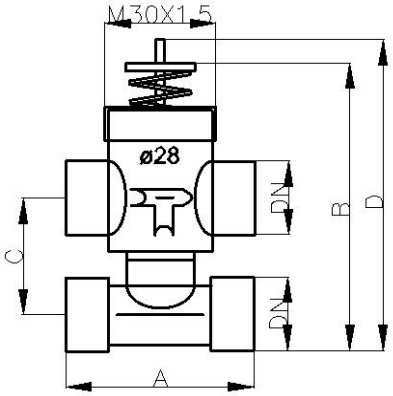


A.5.3. 2-Way 1/2" Valve Body



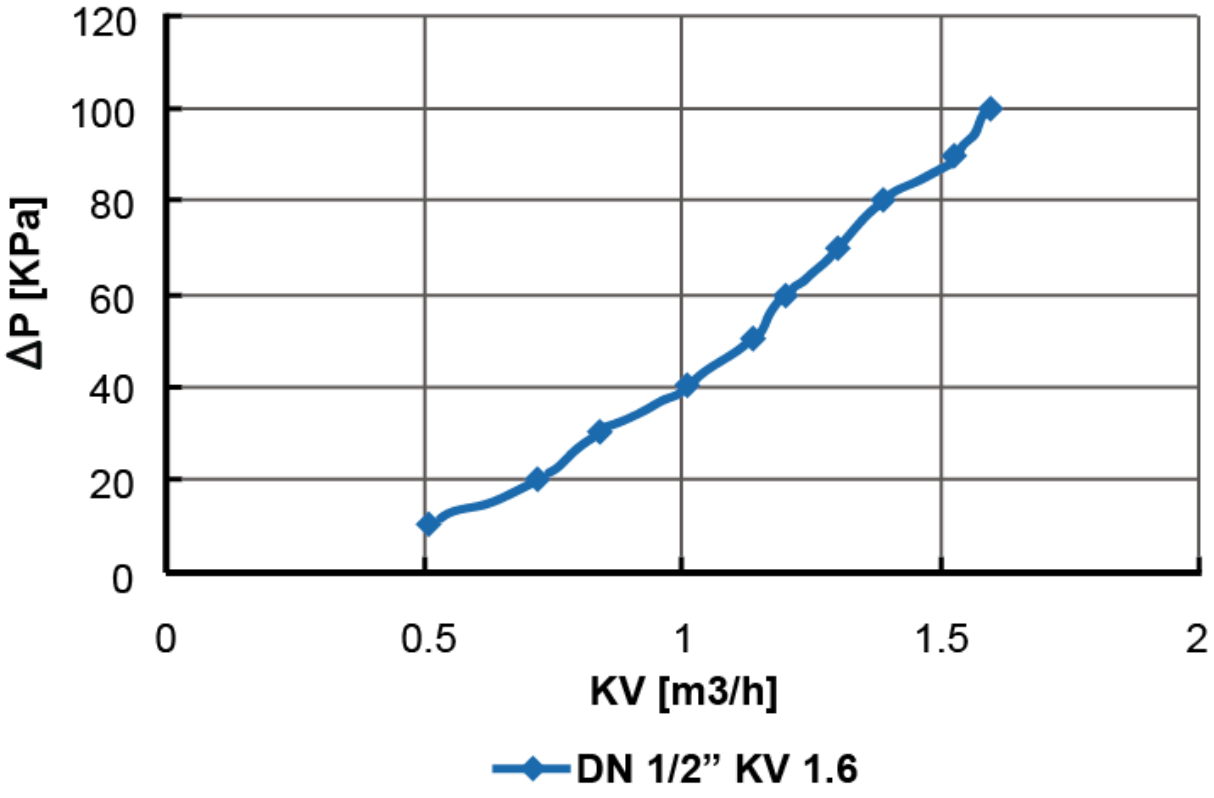
Valve Model	Valve Dimensions (mm)				
	DN	A	B	C	D
SK-DFPS-A-003a	D15 (G1/2”)	52	47	19.5	63

A.5.4. 3-Way 1/2" Valve Body



Valve Model	Valve Dimensions (mm)				
	DN	A	B	C	D
SK-DFPS-A-003b	D15 (G1/2”)	52	70	40	86

Differential Pressure Chart



B. Safety Precautions

- When installing, performing maintenance or servicing the air conditioning equipment, observe the precautions stated in this manual, in addition to those stated in the labels attached around the unit.
- Ensure all local and national safety codes, laws, regulations, as well as general electrical and mechanical safety guidelines are followed for installation, maintenance and service.
- The appliance is for indoor use only.
- Ensure the correct mains supply, with respect to the rating label on the unit, is used.
- Power supply should be incorporated in the fixed wiring and must have a contact separation gap of at least 3mm in between each active phase of conductors.
- If the supply cord is damaged, it must be replaced by qualified personnel.
- Installing and servicing air conditioning equipment should be done by qualified service personnel only.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons lacking in experience and knowledge of the appliance, unless they have been given supervision or instruction concerning it.
- Children should be supervised to ensure they do not play with the appliance.
- User of this appliance is responsible for his/her own safety.
- Warranty shall be voided if installation instructions and safety precaution stated in this manual are not observed.
- Never cut off the mains supply when unit is under operation. The unit should only be switched off by using the ON-OFF button on the control interface.

WARNING

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

B.1. Installation

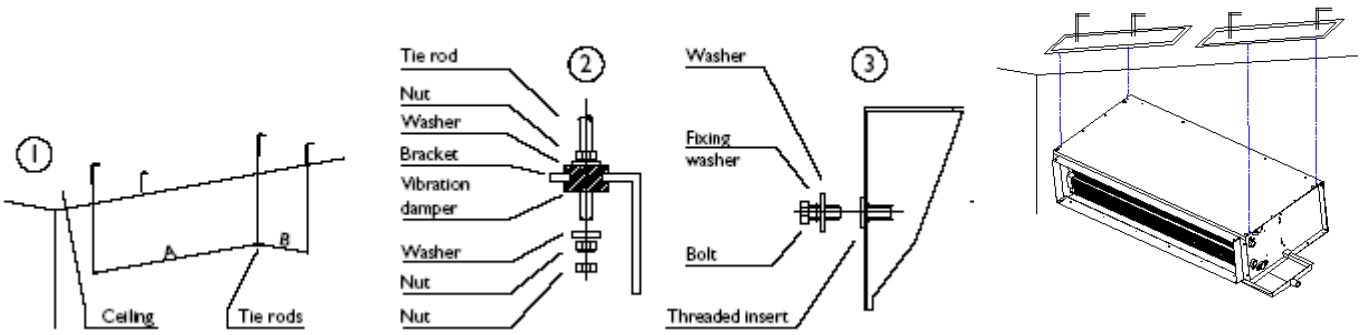
B.1.1. Location

Before installing and running the unit, please check the following:

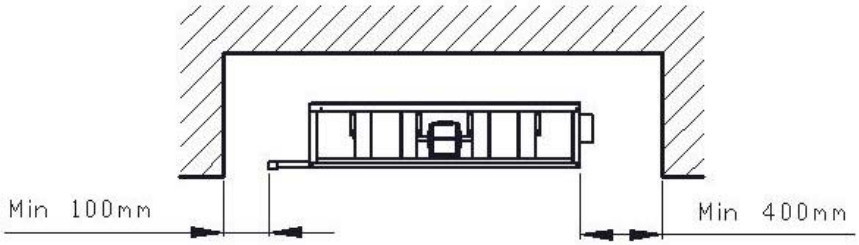
1. There must be enough space for the unit installation and maintenance. Please refer to the figure at the bottom of this page for the unit's outlines and dimensions and for the minimum distance between the unit and its surroundings.
2. Please ensure there is enough space for piping connections and electrical wiring.
3. Check whether the hanging rods can support the weight of the unit (see specification table for weight of the unit).
4. The unit must be installed horizontally to ensure proper operation and condensate draining.
5. The external static pressure of the ducting must be within the unit's static pressure range.
6. Confirm that the unit has been switched OFF before installing or servicing the unit.

B.1.2. Unit Installation

1. The unit is designed to be installed in a concealed ceiling. Installation and maintenance should be performed by qualified personnel who are familiar with local codes and regulations, and are experienced with this type of appliance.
2. Please refer to the pictures below as they illustrate the installation procedure.



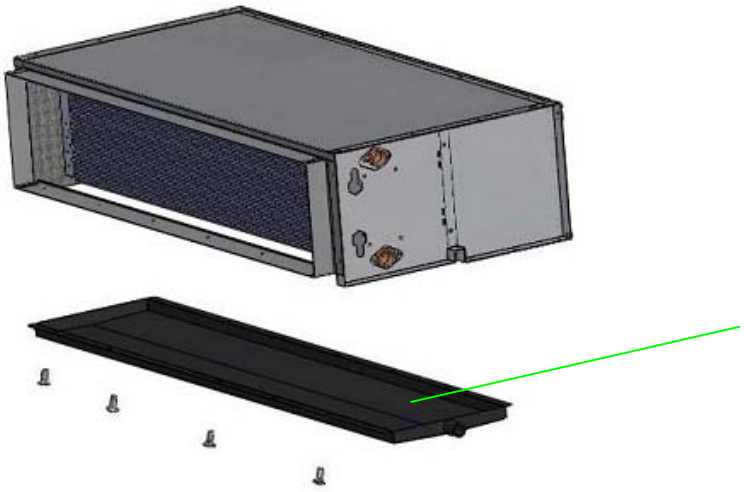
Caution:
Make sure the top of the unit is level after installation. The drain pan is designed with a slight gradient to facilitate drainage.



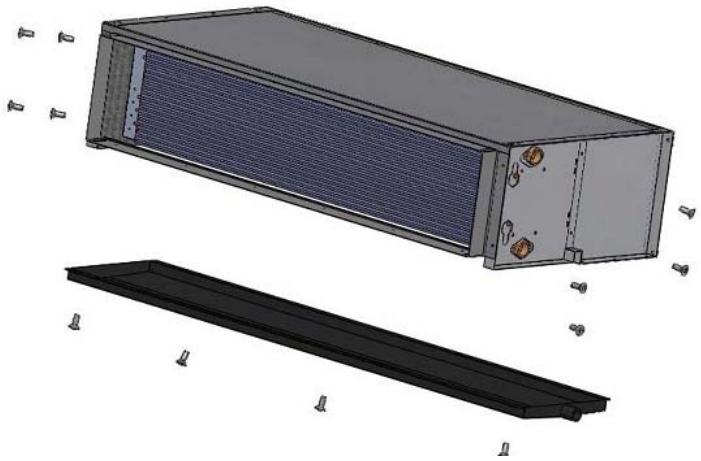
B.1.3. How to Interchange Left/Right Sided Connection

FDLD series unit's connection can be changed from one side to the other on site depending on installation requirements. Please refer to the following images for steps on how to change the left/right side connection:

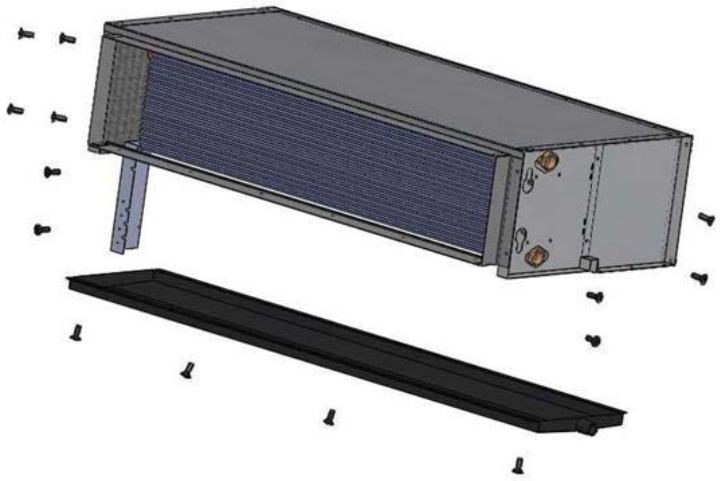
Step 1: Remove the drain pan



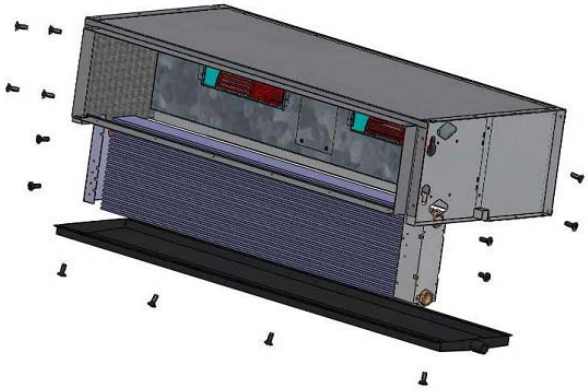
Step 2: Remove 8 screws, 4 on each side



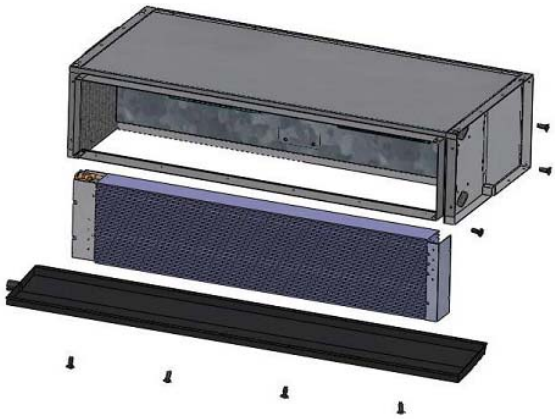
Step 3: Take off the back mounting brackets of the coil by removing 2 screws



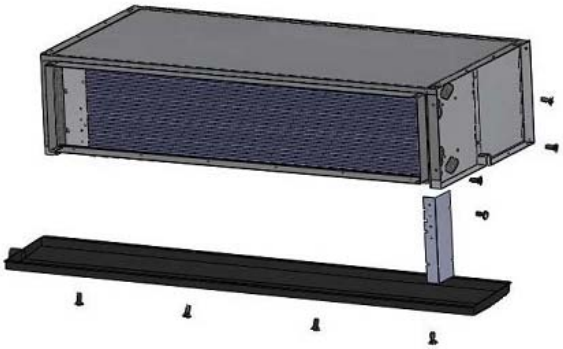
Step 4: Take the coil out of the case



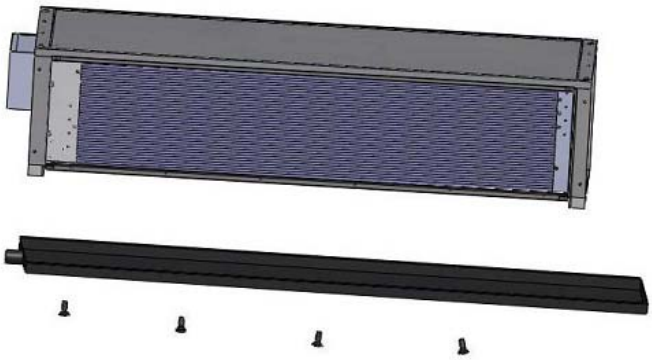
Step 5: Change the coil direction and put the coil back into the case



Step 6: Install the back mounting bracket of the coil



Step 7: Replace the drain pan



B.1.4. Pipe Connections

a) CONNECTING SUPPLY WATER PIPING

Make sure the diameter of the water pipes fits and is not less than the diameter of the connection on the unit. When connecting the water pipes to the coil, take care not to damage the coil manifold. During this operation, hold the coil connections firm with a spanner to avoid damaging them.
The fittings are located on the back of the unit with the air outlets located at the front of the unit.

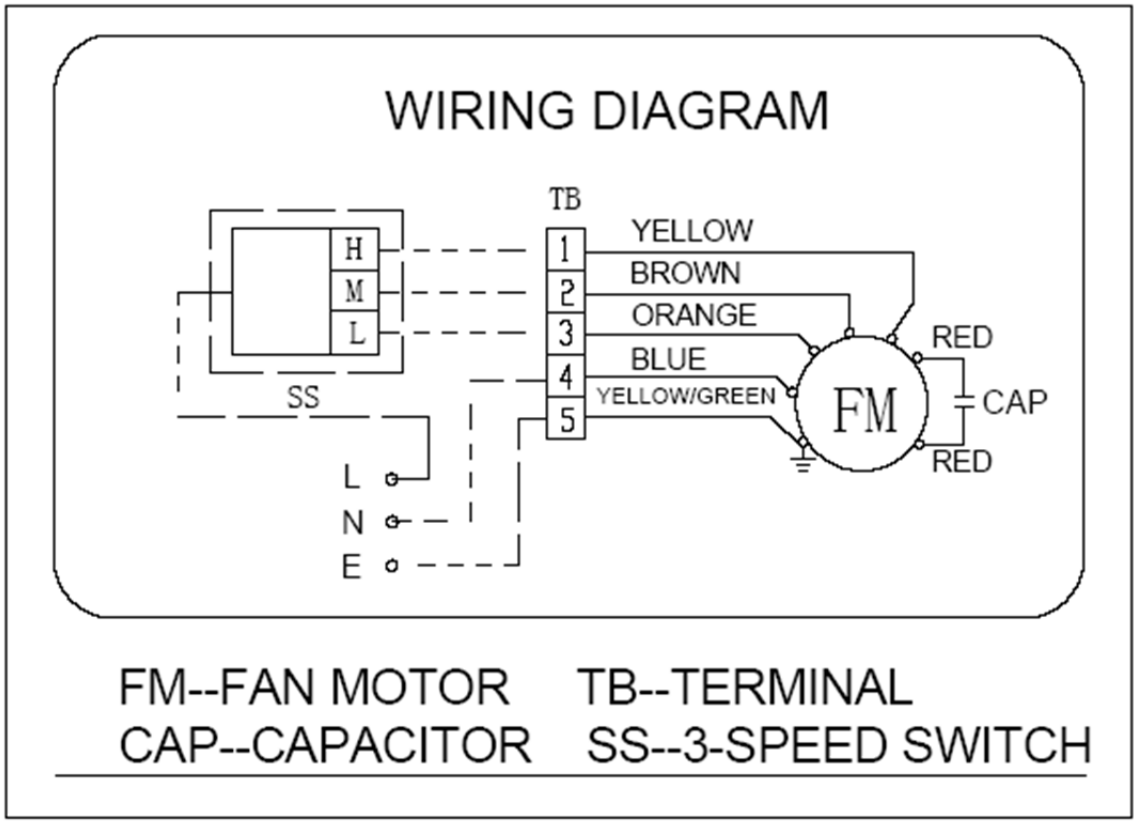
b) CONNECTING THE DRAIN WATER PIPING

This operation must be carried out with particular care. The unit is fitted with a gravity drainage condensate drain pan with an open connection on the back of the unit. The pipe should have an internal diameter of at least 16 mm.
The drain connection has an external diameter of 18 mm.

Proceed according to the following instructions:

1. Connect the condensate drain hose to the pan outlet with a hose clip.
2. Make sure the drain pipe has a slope of at least 2 cm/m without obstructions or bottlenecks.
3. Fit a siphon. By eliminating the pressure drop caused by the fan, this prevents air being sucked up the drain hose.
4. Connect the condensate drain pipe to a rainwater drainage system. Do not connect to the sewage system as odors may be drawn in if the water in the siphon evaporates.
5. After connecting the piping, check that the condensate drainage is working correctly by pouring water into the pan.

B.1.5. Electrical Connection ~T Configuration: Wiring diagram



Blue wiring is N.

C. Maintenance

C.1. General Maintenance

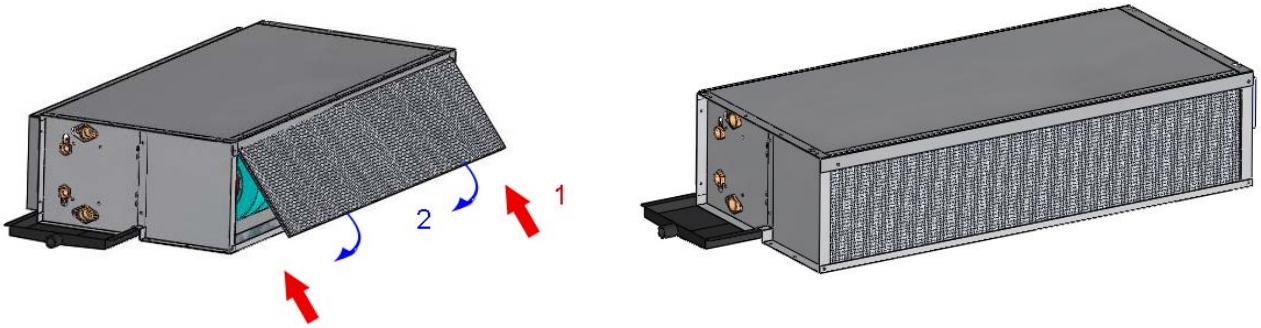
1. Installation and maintenance should be performed by qualified personnel who are familiar with local codes and regulations, and are experienced with this type of appliance.
2. Confirm that the unit has been switched OFF before installing or servicing the unit.
3. A good general maintenance plan will prevent damage to and unexpected shutting down of the equipment.
4. Dirty filters reduce air flow as well as unit performance. Therefore changing or cleaning the filters is very important. Check the cleanliness of the filter and replace or clean as required monthly.
5. Coils should be cleaned with compressed air or water to remove dust, dirt or lint. They can be brushed with a soft brush or vacuumed with a vacuum cleaner.
6. If the water coil is not being used during the winter season it should be drained, or an anti-freezing solution should be added to the water circuit to avoid freezing.

C.2. Monthly Maintenance

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

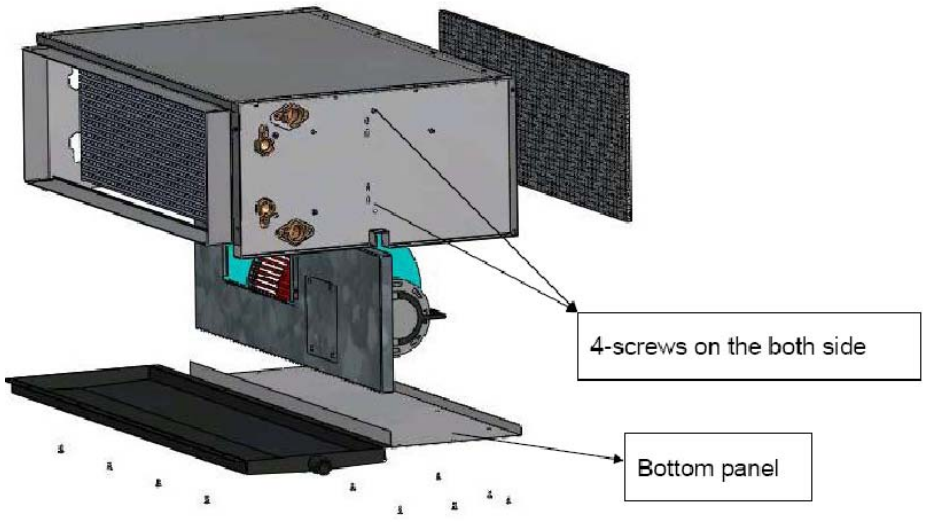
C.3. Filter Cleaning

1. Remove the filter from the bottom.
2. Clean the filter with a brush or with water.
3. Replace the filter by sliding it back into the groove.



C.4. Fan-Motor Assembly Maintenance

1. Remove the screws from the bottom panel.
2. Remove 4 screws from both sides of the unit.
3. The complete fan-motor assembly can then be taken out easily.



D. Control Specifications

SK-NCPDWL-001b ~S Configuration: Full Control PCB

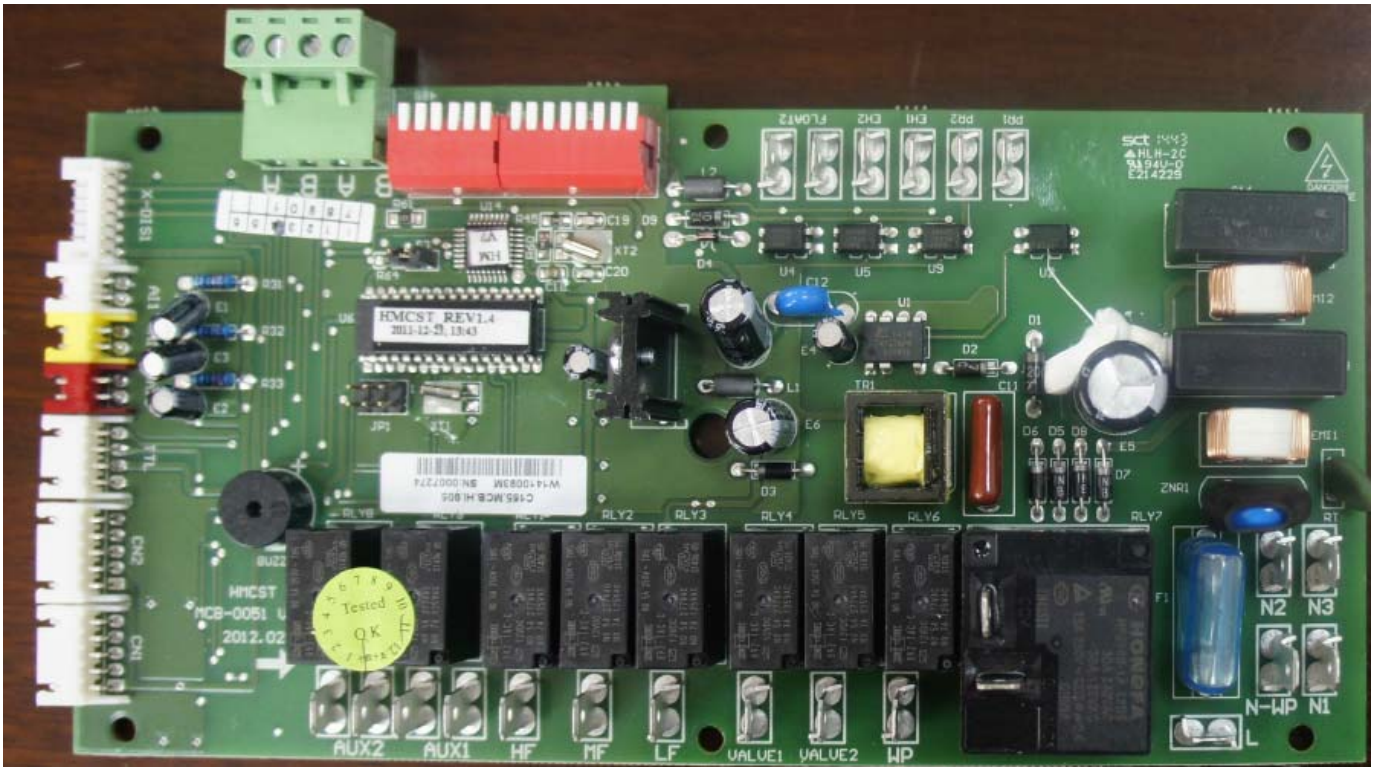
Abbreviations

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

D.1. I/O Port Definitions

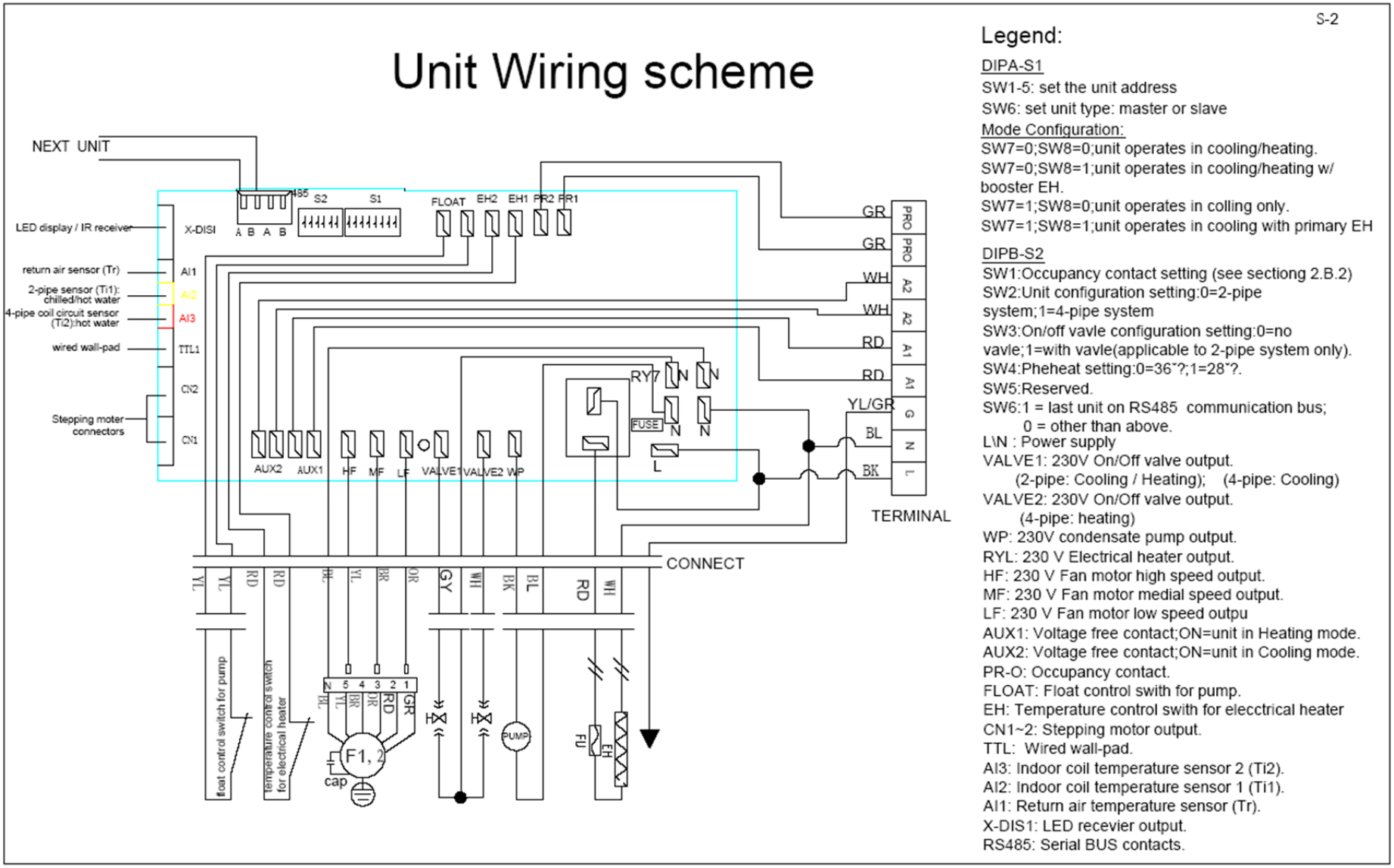
I/O		Code	2-Pipe	4-Pipe
Analogue Input	Room Sensor	AI1	Return air temperature (Tr)	
	Chilled water Sensor	AI2	Chilled / hot water coil circuit (Ti1)	Chilled water coil circuit (Ti1)
	Hot water Sensor	AI3	N/A	Hot water coil circuit (Ti2)
Input	IR receiver	X-DIS 1	Digital communication port to LED display/ IR receiver board.	
	Wired wall pad	TTL1	Digital communication port to wired wall-pad board.	
Digital input	Occupancy contact	PR1/PR2	This contact may be connected to occupancy sensor or BMS system. **DIP-SWITCH IS ON. (Window contact)** The contact is normally open. If the contact has been closed for 10 minutes, the unit will shut down. When the contact is open again, the unit restarts. **DIP-SWITCH IS OFF. (Economy contact)** Cooling operation will only be activated when Tr - Ts ≥ 4ºC. If Tr<Ts, cool operation will be terminated. Heating operation will only be activated when Tr-Ts≤ -4ºC. If Tr>Ts, heating operation will be terminated.	
	Float switch	Float	Voltage-free (NC)	
	Electrical heater safety switch	EH	Voltage-free (NC). The contact is closed before the EH is turned on.	
Power input	Phase	L	Power supply to the PCB and all the loads connected to the voltage outputs. Max length: 5m.	
	Neutral	N	Power supply to the PCB and all the loads connected to the voltage outputs. Max length: 5m.	
	Earth	GND	Power supply to the PCB and all the loads connected to the voltage outputs. Max length: 5m.	

I/O		Code	2-Pipe	4-Pipe
Voltage output	High fan speed	HF	Max length: 5m. Voltage output (L)	
	Medium fan speed	MF	Max length: 5m. Voltage output (L)	
	Low fan speed	LF	Max length: 5m. Voltage output (L)	
	Valve1	MTV1	Water valve Voltage output (L)	Chilled water valve Voltage output (L)
	Valve2	MTV2	Reserved	Hot water valve Voltage output (L)
	Water pump	WP	Voltage output (L)	
	Voltage of electrical heater (Live)	L-EH	Voltage output (L), maximum 30A	
Output	Stepping motor	CN1-2	Power supply to louver stepping motors Voltage output (L)	
	Cold water free contact.	AUX2	Voltage free contact. To ensure the sensitivity of the connection, please make sure Max wiring length < 30m. Maximum load 5A.	
	Hot water free contact.	AUX1	Voltage free contact. To ensure the sensitivity of the connection, please make sure Max wiring length < 30m. Maximum load 5A.	
	In Modbus signal	AB	Terminals for local network serial connection	
	Out Modbus signal	AB		

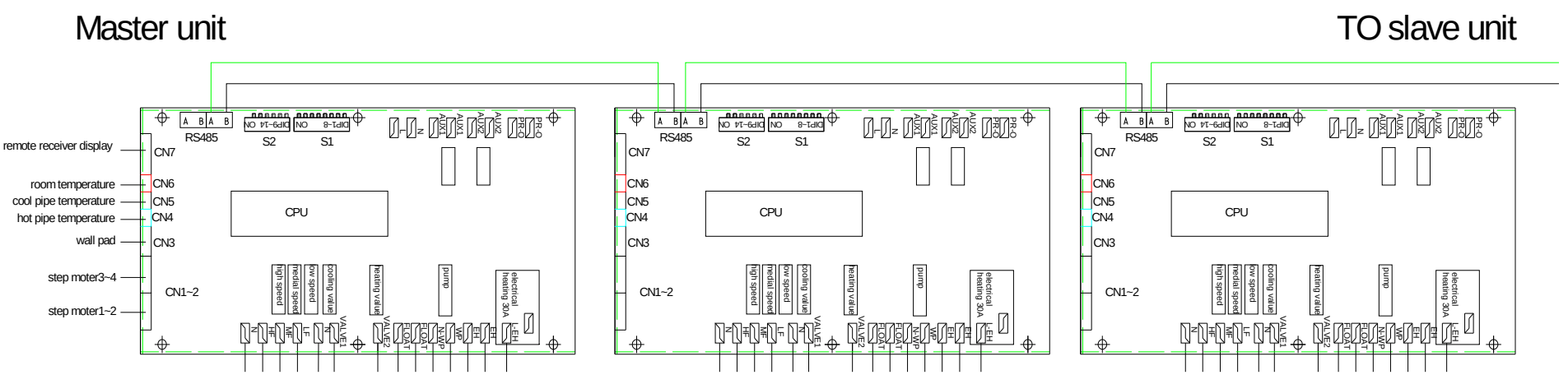


D.2. Wiring Diagram

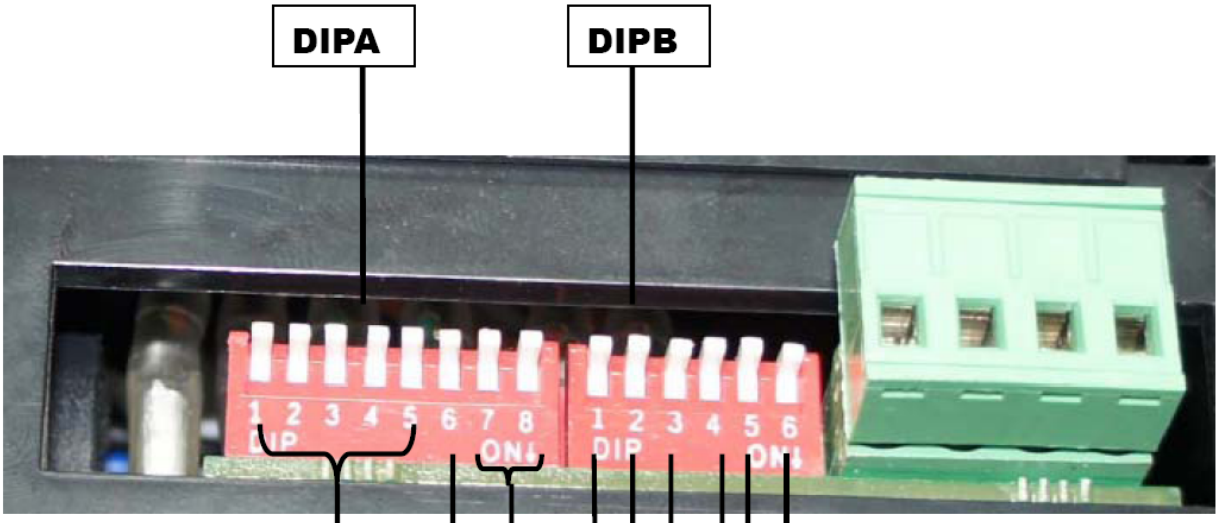
SK-NCPDWL-001b, ~S Configuration: Full Control PCB:



Master Slave Networking Wiring Diagram:



D.3. Configuration Settings



S1-S5 address setting

Master / slave setting
SW6=1 (ON) master
SW6=0 (OFF) slave

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

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

SW7=1
SW8=0 Cooling mode only available

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

SW6 RS485 termination setting
SW6=0 Other than below (Default setting)
SW6=1 Last unit on RS485 communication bus

SW5 Reserved

Preheat temperature setting
SW4=1 (ON) 28°C
SW4=0 (OFF) 36°C

230VAC on/off valve setting
SW3=1 (ON) With valve
SW3=0 (OFF) No valve

2-pipe/4-pipe system configuration
SW2=1 (ON) 4-pipe system
SW2=0 (OFF) 2-pipe system

PR-O contact setting
SW1=1 Window contact (remote on/off)
- When PROs closed for 10 minutes, unit enters standby mode.
- When PROs opened, unit resumes operation.

SW1=0 Economy contact

When PROs closed, dead-band condition is increased from "Tr=Ts+/-1" to "Tr=Ts+/-4".

AIR CONDITIONER ON/OFF

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

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

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

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

AUTO-RESTART

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

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

a) Handset only user interface:

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

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

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

D.4. Control Logic For 2-Pipe System

D.4.1. With Valve Configuration

COOL MODE

a) MTV2, AUX1 and electric heater are always off.
b) If Tr ≥ Ts + 1ºC (or + 4ºC 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 Tr < Ts, then cool operation is terminated and MTV1 and AUX2 are turned off. Indoor fan runs at set speed.
d) The range of Ts is 16 - 30ºC
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 Ti1 ≤ 2 ºC 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 Ti1 ≥ 5ºC 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

<u>Heat mode without electrical heater</u>

a) MTV2, AUX2 and electric heater are always off.
b) If Tr ≤ Ts - 1 ºC (or - 4ºC 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 Tr > Ts, then heat operation is terminated and MTV1 and AUX1 are turned off. Indoor fan repeatedly runs at low fan speed for 30 seconds and then stops for 3 minutes.
d) The range of Ts is 16 - 30ºC.
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.

<u>Heat mode with electrical heater as booster</u>

a) MTV2 and AUX2 are always off.
b) If Tr ≤ Ts - 1ºC (or - 4ºC 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 Tr > Ts, then heat operation is terminated and MTV1 and AUX1 are turned off. Indoor fan repeatedly runs at low fan speed for 30 seconds and then stops for 3 minutes.
d) If Ti1 < 40ºC, then the electrical heater is turned on. If 40ºC ≤ Ti1 < 45ºC, then the electrical heater maintains its original state. If Ti1 ≥ 45ºC, then the electrical heater is turned off.
e) The range of Ts is 16 - 30ºC
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.

Heat mode with electrical heater as primary heat source

a) MTV1, MTV2, and AUX2 are always off
b) If Ti2 ≤ 30ºC (or Ti2 is damaged or disconnected), AND if Tr ≤ Ts-1ºC (or -4ºC if economy contact is activated), heat operation is activated, electrical heater and AUX1 are turned on. Indoor fan runs at set speed.
c) If Tr > Ts, then heat operation is terminated and the electrical heater and AUX1 are turned off. Indoor fan repeatedly runs at low fan speed for 30 seconds and then stops for 3 minutes.
d) The range of Ts is 16-30 ºC
e) Indoor fan speed can be adjusted to low, medium, high and auto.

PRE-HEAT

Pre-heat without electrical heater

a) If Ti1 < 36ºC [or < 28ºC is selected by DIPB-S2 position SW4], then MTV1 and AUX1 are turned on, indoor fan remains off.
b) If Ti1 ≥ 38ºC [or ≥ 30ºC 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.

Pre-heat with electrical heater

Indoor fan will turn on after the electrical heater has been turned on for 10 seconds.

POST-HEAT

Post-heat without electrical heater

a) If Ti1 ≥ 38ºC, then MTV1 and AUX 1 are off, then indoor fan continues to run at set speed.
b) If 36ºC ≤ Ti1 ≤ 38ºC, then MTV1 and AUX1 are turned off. Then indoor fan maintains its original state.
c) If Ti1 < 36ºC, then MTV1 and AUX1 are turned off. Then indoor fan repeatedly runs for 30 seconds and then stops for 3 minutes.
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.

Post-heat with electrical heater

Indoor fan will shut down after the unit has been turned off for 20 seconds.

OVER-HEAT PROTECTION OF INDOOR COIL

a) If Ti1 ≥ 75ºC, then MTV1 and AUX1 are turned off. Indoor fan remains on and runs at high speed.
b) If Ti1 < 70ºC, 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 Tr ≥ 25ºC, then MTV1 and AUX2 will be ON for 3 minutes, and then OFF for 4 minutes.
c) If 16ºC ≤ Tr < 25ºC, then MTV1 and AUX2 will be ON for 3 minutes, and then OFF for 6 minutes.
d) If Tr < 16ºC, 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.

AUTOMODE

a) Auto cool/heat/heat with electric heater as booster
Every time the unit is turned on, MTV1 is on, AUX1, AUX2 and fan are off. MTV2 and heater are always off.
After 120secs, the subsequent operation mode is decided according to the following programs:

i. If the coil temperature sensor (Ti1) ≥ 36ºC, then MTV1, AUX1 and fan turn on or off according to HEAT mode.
ii. If Ti1 < 36ºC, then MTV1, then AUX2 and fan turn on or off according to COOL mode.

Unit remains in AUTO COOL or AUTO HEAT mode throughout the operating cycle until the user changes the mode manually or restarts the unit.
Should the Ti1 sensor be damaged, auto mode will not function.

b) Auto heat with electric heater as primary heat source / all configuration auto changeover
If current running mode is auto cool mode, then the control logic will change over to auto heat mode when all the following conditions are met:

i. Ts-Tr ≥ 1.0°C (or 4 ºC if economy contact is activated)
ii. MTV1 has stop ≥ 10 min.

If current running mode is auto heat mode, then the control logic will change over to auto cool mode when all the following conditions are met:

i. Tr-Ts ≥ 1.0°C (or 4 ºC if economy contact is activated)
ii. MTV1 has stop ≥ 10 min.

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

D.4.2. Without Valve Configuration

COOL MODE

a) Electric heater, AUX1, MTV1 and MTV2 are always off.
b) If Tr ≥ Ts + 1ºC (or + 4ºC if economy contact is activated), then cool operation is activated and AUX2 is turned on. Indoor fan runs at set speed.
c) If Tr < Ts, then cool operation is terminated and AUX2 is turned off. Indoor fan is turned off.
d) The range of Ts is 16 - 30ºC
e) Indoor fan speed can be adjusted to low, medium, high and auto.

Note: When the unit is turned off, the indoor fan shut down after 5 seconds.

LOW TEMPERATURE PROTECTION OF INDOOR COIL

a) If Ti1 ≤ 2ºC 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 Ti1 ≥ 5ºC 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, MTV1, MTV2, AUX1 and AUX2 are turned off.
b) Indoor fan speed can be adjusted to low, medium and high.

HEAT MODE

Heat mode without electrical heater

a) MTV1, MTV2, AUX2 and heater are always off.
b) If Tr ≤ Ts - 1ºC (or - 4ºC if economy contact is activated), then heat operation is activated and AUX1 is turned on. Indoor fan runs at the set speed.
c) If Tr > Ts, then heat operation is terminated and AUX1 is turned off. Indoor fan repeatedly runs at low fan speed for 30 seconds and then stops for 3 minutes..
d) The range of Ts is 16 - 30ºC.
e) Indoor fan speed can be adjusted to low, medium, high and auto.

Heat mode with electrical heater as booster

Not available.

Heat mode with electrical heater as primary heat source

Not available.

PRE-HEAT

Pre-heat without electrical heater

a) MTV1, MTV2 and AUX2 are off.
b) If Ti1 < 36 ºC [or 28 ºC depending on DIP setting], AUX1 is on while indoor fan remains off.
c) If Ti1 ≥ 38 ºC [or 30 ºC depending on DIP setting], AUX1 is on while indoor fan runs at set speed.
d) If indoor coil temperature sensor is damaged, pre-heat time is set for 2 minutes and indoor fan runs at set speed.

Pre-heat with electrical heater

Not available.

POST HEAT

Without Electrical Heater

Not available.

With Electrical Heater

Not available.

OVERHEAT PROTECTION OF INDOOR COIL

a) If Ti1 ≥ 75ºC, then AUX1 is turned off, indoor fan remains on and runs at high speed.
b) If Ti1 < 70ºC, then AUX1 is 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) MTV1, MTV2, AUX1 and heater are always off.
b) If Tr ≥ 25ºC, then indoor fan and AUX2 will be ON for 3 minutes, and then OFF for 4 minutes.
c) If 16ºC ≤ Tr < 25ºC, then indoor fan and AUX2 will be ON for 3 minutes, and then OFF for 6 minutes.
d) If Tr < 16ºC, then indoor fan and AUX2 will be turned off.
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.

AUTOMODE

Not available.

D.5. Control Logics For 4-Pipe System

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

COOL MODE

a) MTV2, AUX1 and Electrical Heater are always off.
b) If Tr ≥ Ts + 1ºC (or + 4ºC if economy contact is activated), then cool operation is activated, MTV1 and AUX2 are turned on. Indoor fan runs at set speed.
c) If Tr < Ts, then cool operation is terminated, MTV1 and AUX2 are turned off. Indoor fan runs at set speed.
d) The range of Ts is 16 - 30ºC
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 Ti1 ≤ 2ºC 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 Ti1 ≥ 5ºC 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) MTV1, AUX2 and are heater always off.
b) If Tr ≤ Ts - 1ºC (or - 4ºC if economy contact is activated), then heat operation is activated, MTV2 and AUX1 are turned on. Indoor fan runs at the set speed.
c) If Tr > Ts, then heat operation is terminated, MTV2 and AUX1 are turned off. Indoor fan repeatedly runs at low fan speed for 30 seconds and then stops for 3 minutes.
d) The range of Ts is 16 - 30ºC.
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 Tr ≤ Ts - 1ºC (or - 4ºC if economy contact is activated), then heat operation is activated, MTV2 and AUX1 are turned on. Indoor fan runs at the set speed.
c) If Tr > Ts, then heat operation is terminated, MTV2 and AUX1 are turned off. Indoor fan repeatedly runs at low fan speed for 30 seconds and then stops for 3 minutes.
d) If Ti2 < 40ºC, then the electrical heater is turned on. If 40ºC ≤ Ti2 < 45ºC, then the electrical heater maintains its original state. If Ti2 ≥ 45ºC, then the electrical heater is turned off.
e) The range of Ts is 16 - 30ºC
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 full closed.

PRE-HEAT

Without Electrical Heater

a) If Ti2 < 36ºC [or 28ºC depends on DIP setting], then MTV2 and AUX1 are on, then indoor fan remains off.
b) If Ti2 ≥ 38ºC [or 30ºC depends on DIP setting], then MTV2 and AUX1 are on, then indoor fan runs at set speed.
c) If indoor coil temperature sensor is damaged, then pre-heat time is set for 2 minutes and indoor fan runs at set speed.

With Electrical Heater

a) MTV2 and AUX1 turn on.
b) Indoor fan will turn on after the electrical heater is turned on for 10 seconds.

POST HEAT

Without Electrical Heater

a) If Ti2 ≥ 38ºC, then MTV2 and AUX 1 are turned off. Indoor fan continues to run at set speed.
b) If 36ºC ≤ Ti2 ≤ 38ºC, then MTV2and AUX1 are turned off. Indoor fan maintains its original state.
c) If Ti2 < 36ºC, then MTV2 and AUX1 are turned off. Indoor fan repeatedly runs for 30 seconds and then stops for 3 minutes.
d) If the indoor coil temperature coil is damaged, then post-heat time is set for 3 minutes .Indoor fan runs at set speed.

With Electrical Heater

Indoor fan will shut down after the unit has been turned off for 20 seconds.

OVER HEAT PROTECTION OF INDOOR COIL

a) If Ti2 ≥ 75ºC, then MTV2 and AUX1 are turned off, indoor fan remains on and runs at high speed.
b) If Ti2 < 70ºC, 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 Tr ≥ 25ºC, then MTV1 and AUX2 will be ON for 3 minutes, and then OFF for 4 minutes.
c) If 16ºC ≤ Tr < 25ºC, then MTV1 and AUX2 will be ON for 3 minutes, and then OFF for 6 minutes.
d) If Tr < 16ºC, 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.

AUTOMODE

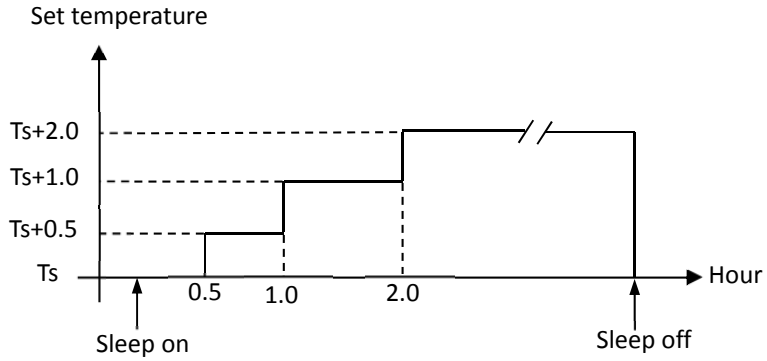
a) If the current running mode is AUTO COOL mode, it will change over to AUTO HEAT mode when all the following conditions are met:
    i. Ts – Tr ≥ 1ºC (or - 4ºC if economy contact is activated)
    ii. MTV1 has closed ≥ 10 min.
b) If the current running mode is AUTO HEAT mode, it will change over to AUTO COOL mode when all the following conditions are met:
    i. Tr – Ts ≥ 1ºC (or + 4ºC if economy contact is activated)
    ii. MTV2 has closed ≥ 10 min.

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

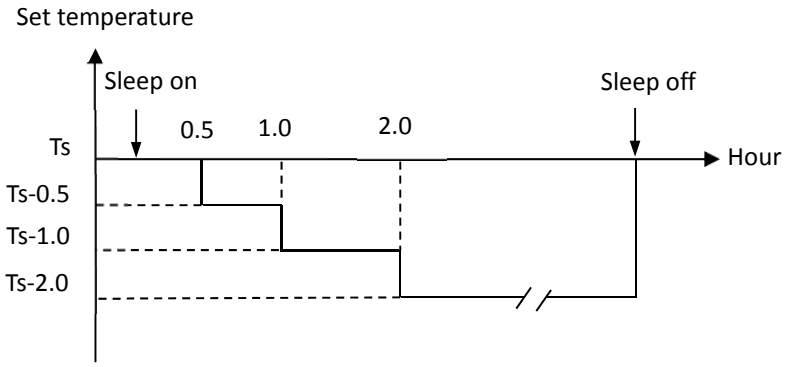
D.6. Sleep Mode

a) The sleep mode can only be set when the unit is in cool mode or heat mode.
b) If the sleep mode is activated when the unit is in cool mode, then the indoor fan will run at low speed and Ts will increase by 2ºC over 2 hours.
c) If the sleep mode is activated when the unit is in heat mode, then the indoor fan will run at set speed and Ts will decrease by 2ºC over 2 hours.
d) Changing the mode of operation will cancel the sleep mode.

The cool mode sleep profile is:



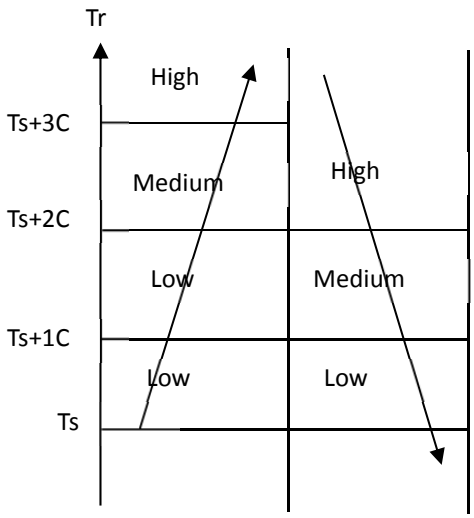
The heat mode sleep profile is:



D.7. Auto Fan Speed

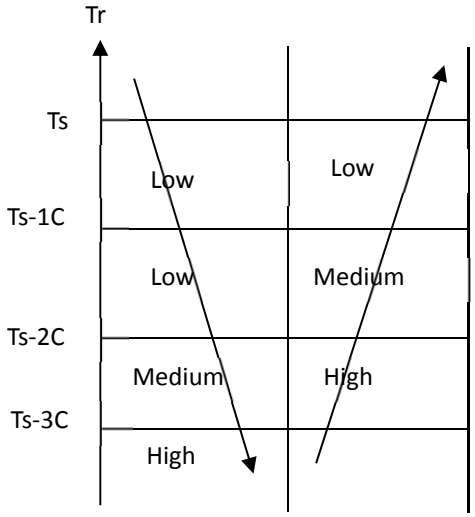
COOL MODE

Fan speed cannot change until it has run for more than 30 seconds.
Fan speed is regulated according to the profile below.



HEAT MODE

Fan speed cannot change until it has run for more than 30 seconds.
Fan speed is regulated according to the profile below.



D.8. Swing/Louver

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

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

For wired wall pad with Control Box – I (Integrated Full Control Version)
Louver angle: 0~100 º, opens clockwise, with widest angle at 100 º.
Swing angle: 35~100 º, opens clockwise to 68º. User may stop louver at any desired position between 35~100 º.

D.9. Buzzer

If a command is received by the air conditioner, 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. Operation parameters are mode, set temperature, swing louver's position, and the fan speed. When power supply resumes or the system is switched on again, the same operations as previously set will function.

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

a) This is a tact switch to select Cool→Heat→Off operation mode.
b) In COOL mode, the set temperature of the system is 24ºC with auto fan speed and swing. There are no timer and sleep modes.
c) In HEAT mode, the set temperature of the system is 24ºC with auto fan speed and swing. There are no timer and sleep modes.
d) Master unit that does not use a 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. Drain Pump

Drain pump turns ON if the thermostat cuts in activates during cooling or dehumidification cycle. It remains on for at least 5 minutes after the thermostat cuts out activates. During mode change from cooling to non cooling mode, water pump will turn on for a minimum of 5 minutes.

WARNING!

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

D.13. Float Switch

Float-switch opens before unit is turned on

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

Float switch is opened, when unit is turned on

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

Float switch is opened, when unit is turned off

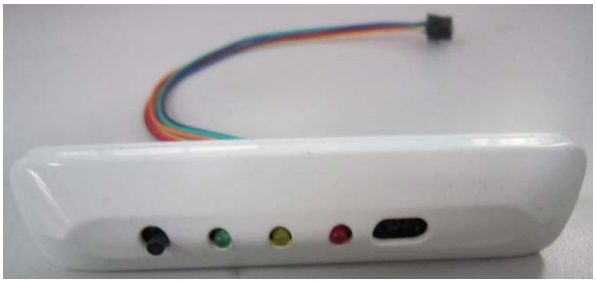
If the float switch is opened, then the drain pump will work. After the float switch is closed, the drain pump will run for an additional 5 minutes. If the float switch is opened for 10 minutes continuously, then the system reports an error.

D.14. Electric Heater Safety Switch

a) Before the electrical heater is turned on, the EH safety switch must be closed. If this contact is opened for ≥ 1 second, the heater will be turned off immediately and report an error. Once the contact is returned to the closed position ≥ 60 seconds, reset the error and the heater will start again.
b) 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.15. LED Indication and Error Description

SK-DFPS-A-002.3 LED receiver in ABS housing with 0.5m pre-wiring



SK-NCPDWL-001b		
Fan speed setting	LED indication	Condition
High speed	Red LED On	Normal
Medium speed	Yellow LED On	Normal
Low speed	Green LED On	Normal

For all units - Green LED			
Error Description	Blink	Reason	Remedy
Electrical heater failure	Green LED blinks 1 times, stops for 3s	*Only for unit with EH.* EH safety switch is opened.	1. Change fan speed to high. 2. Replace the damaged EH safety switch.
Indoor coil sensor 2 failure	Green LED blinks 2 times, stops for 3s	Ti2 sensor unplugged or damaged.	1. Check if Ti2 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Return air sensor failure	Green LED blinks 3 times, stops for 3s	Room sensor unplugged or damaged.	1. Check if Tr plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil sensor 1 failure	Green LED blinks 4 times, stops for 3s	Ti1 sensor unplugged or damaged.	1. Check if Ti1 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil low temperature protection	Green LED blinks 5 times, stops for 3s	Water temperature is lower than 3 ºC.	Check the water temperature.
Indoor coil over heat protection	Green LED blinks 6 times, stops for 3s	Water temperature is higher than 70 ºC.	Check the water temperature
Water pump failure	Green LED blinks 7 times, stops for 3s	Float switch is opened.	1. Check if the condensate water pipe is connected or not. 2. Check if the pump is functioning or not.

D.16. LED Indication 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 LED		
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

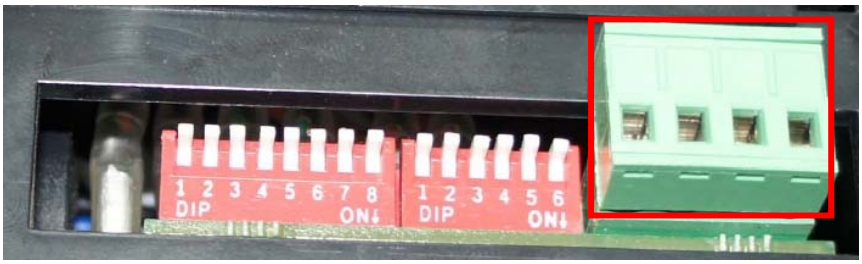
a) The master unit sends data regarding its setting to the slave unit.
b) The master unit settings are unit ON/OFF, Mode, Fan Speed, Timer, Clock, Set Temperature, Swing Function, and Sleep Function for handset operation.
c) The master unit settings are unit ON/OFF, Mode, Fan Speed, Timer, Clock, Set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

a) Disconnect the communication plug from the control box



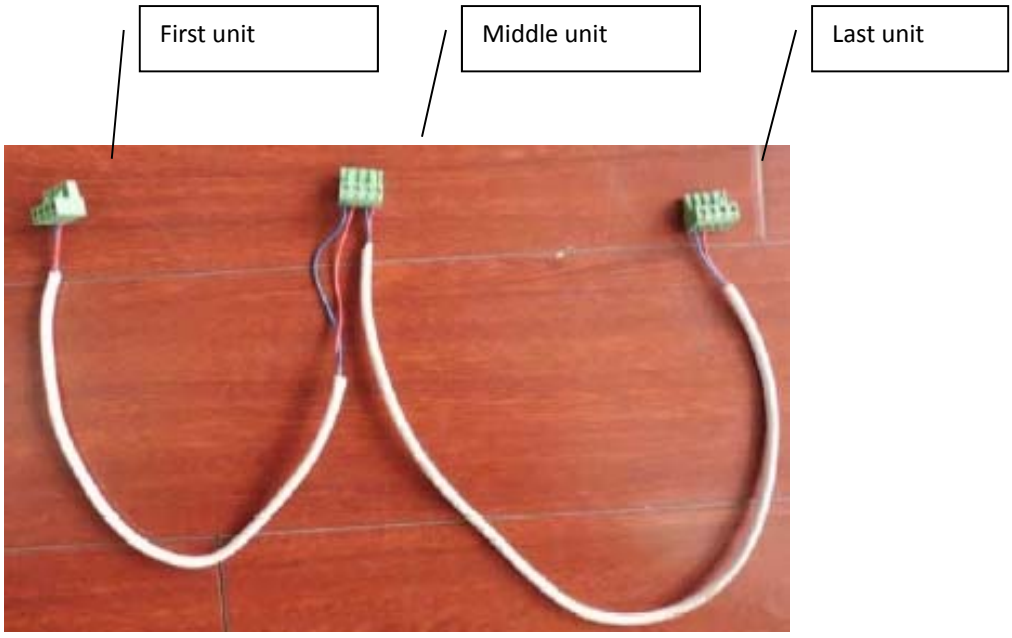
b) Communication plug

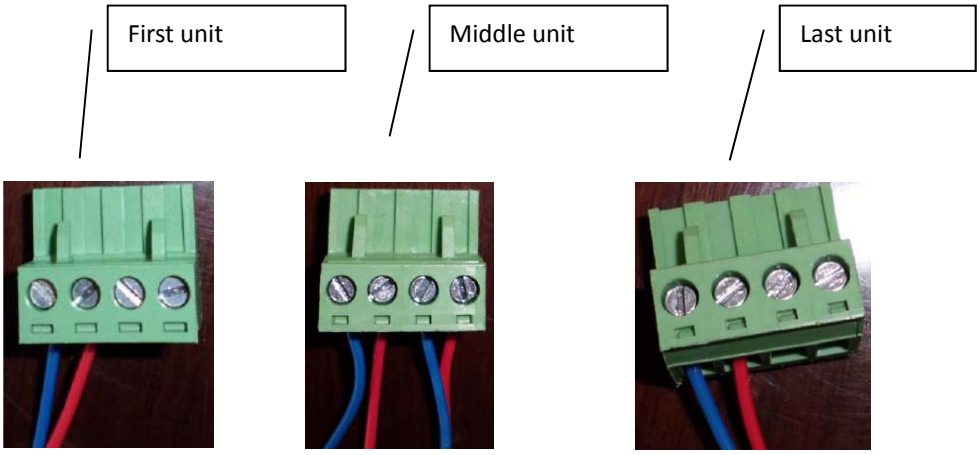
A, B, A, B is printed on the main PCB. When you connect the wires, please ensure connection of A to A and B to B.

c) Connection wire

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

2) Complete wire connection

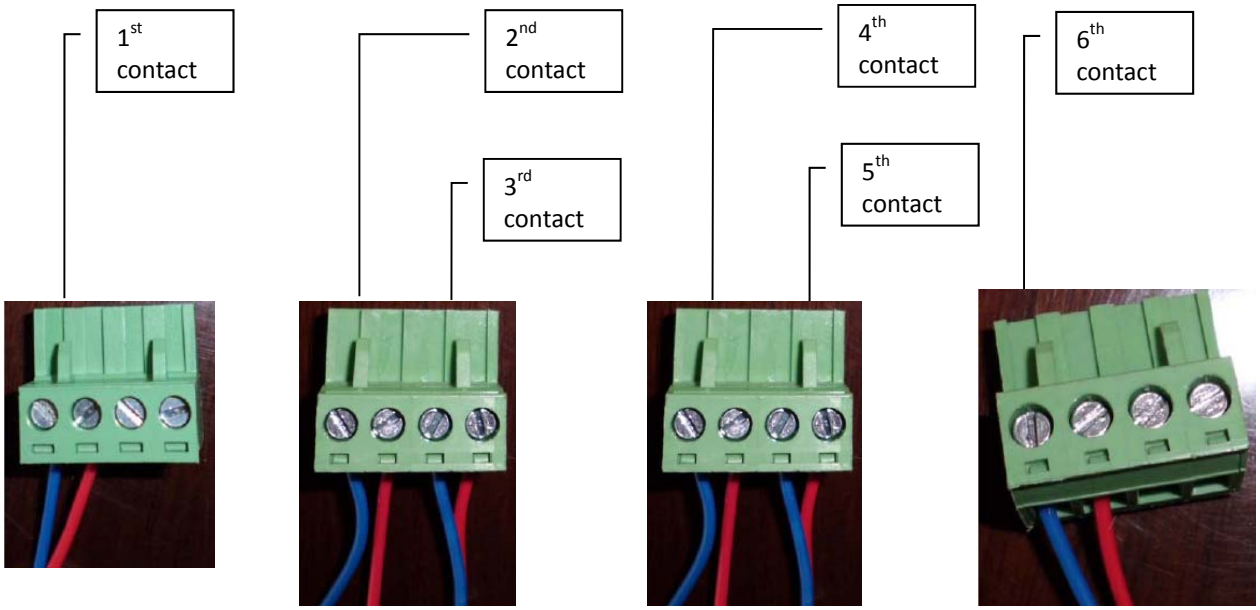




3) Wire connection check

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

ii. Check the wire contact by using a multimeter.



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

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

d) Reconnect the communication plug to the control box

Using Remote Control Handset to Set Master Control Unit:

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

Using Wall pad to Set Master Control Unit:

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

MASTER-SLAVE CONTROL

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

E.1.2. Master – Slave Communication Method

There are two modes for the master-slave structure.

Global Control communication

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

Addressable communication

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

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

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

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

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		
Reserved	100004		
Reserved	100005		
Reserved	100006		
Reserved	100007		
Reserved	100008		
Reserved	100009		
Reserved	100010		
Reserved	100011		
Reserved	100012		
Reserved	100013		
Reserved	100014		
Reserved	100015		

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

Discrete table:

Description	Address	Type*	Remark
MTV1	200000	R	
MTV2	200001	R	
AUX1	200002	R	
AUX2	200003	R	
Condensate pump	200004	R	
Electrical heater	200005	R	
Wired wall pad	200006	R	
PRO	200007	R	
Float switch	200008	R	
Reserved	200009	R	
EH safety switch	200010	R	
Unit ON/OFF status	200011	R	Testing purpose only.

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

Holding Register table:

Description	Address	Type*	Remark
Mode setting	300000	R/W	Cooling mode = 01(H) Humidify mode = 02(H) Fan mode = 04(H) Heating mode = 08(H) Auto mode = 10(H)
Fan speed setting	300001	R/W	Low speed = 04(H) Medium speed = 02(H) High speed = 01(H) Auto fan speed = 07(H)
Louver swing setting	300002	R/W	Position 1 = 01(H) Position 2 = 02(H) Position 3 = 03(H) Position 4 = 04(H) Auto = 0F(H) Stop = 00(H)
Setting temperature	300003	R/W	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:

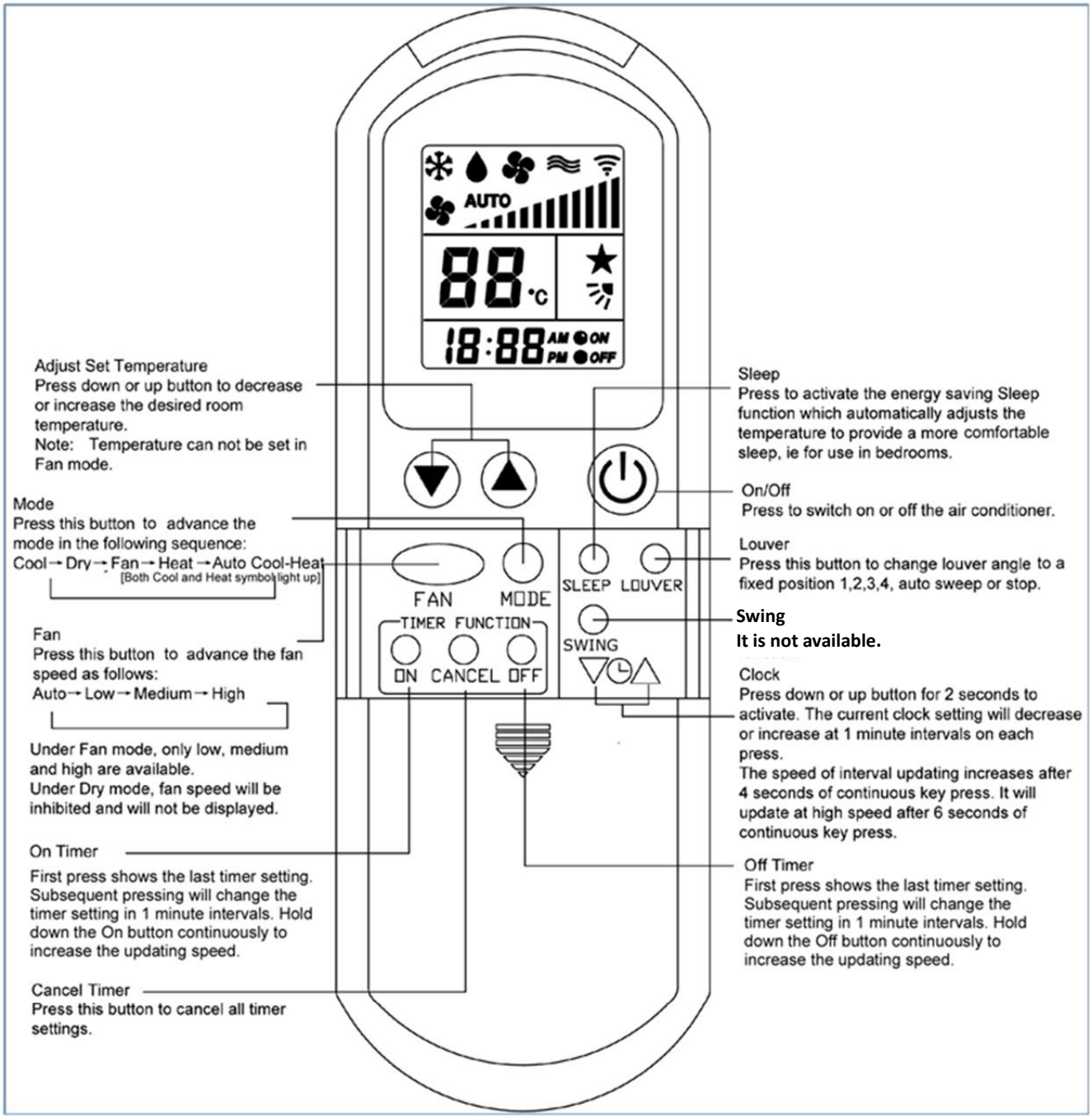
Description	Address	Type*	Remark
Dip switch 1 status	400000	R	
Dip switch 2 status	400001	R	
Room temperature sensor	400002	R	
Ti1 temperature sensor	400003	R	
Ti2 temperature sensor	400004	R	
Error code	400005	R	Bit0 = Room temperature sensor error Bit1 = Ti1 temperature sensor error Bit2 = Ti2 temperature 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 = Reserved Bit12 = Reserved Bit13 = Reserved Bit14 = Reserved Bit15 = Reserved
Fan speed status	400006	R	Low = 04(H) Medium = 02(H) High = 01(H)
Mode status	400007	R	Cooling mode = 01(H) Dehumidify mode = 02(H) Fan mode = 04(H) Heating = 08(H)
Setting temperature status	400008	R	Testing only
Room temperature in wall pad status	400009	R	
Room temperature in main PCB status	400010	R	
Unit type	400011	R	4-pipe = 03, 2-pipe = 02 This setting is configured by dip switch
EC motor 1# RPM	400012	R	
EC motor 2# RPM	400013	R	

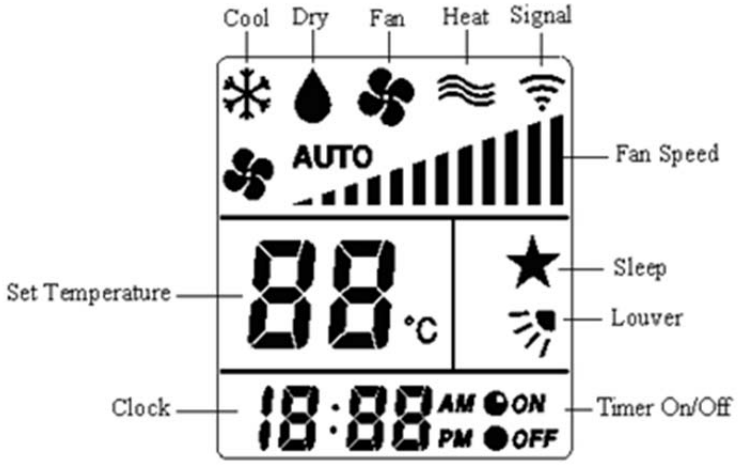
** R = read only, W = write only, R/W = read and write.*

Remark:
The above protocol address is in Base 0.

F. User Interface

F.1. Remote Handset





Attention

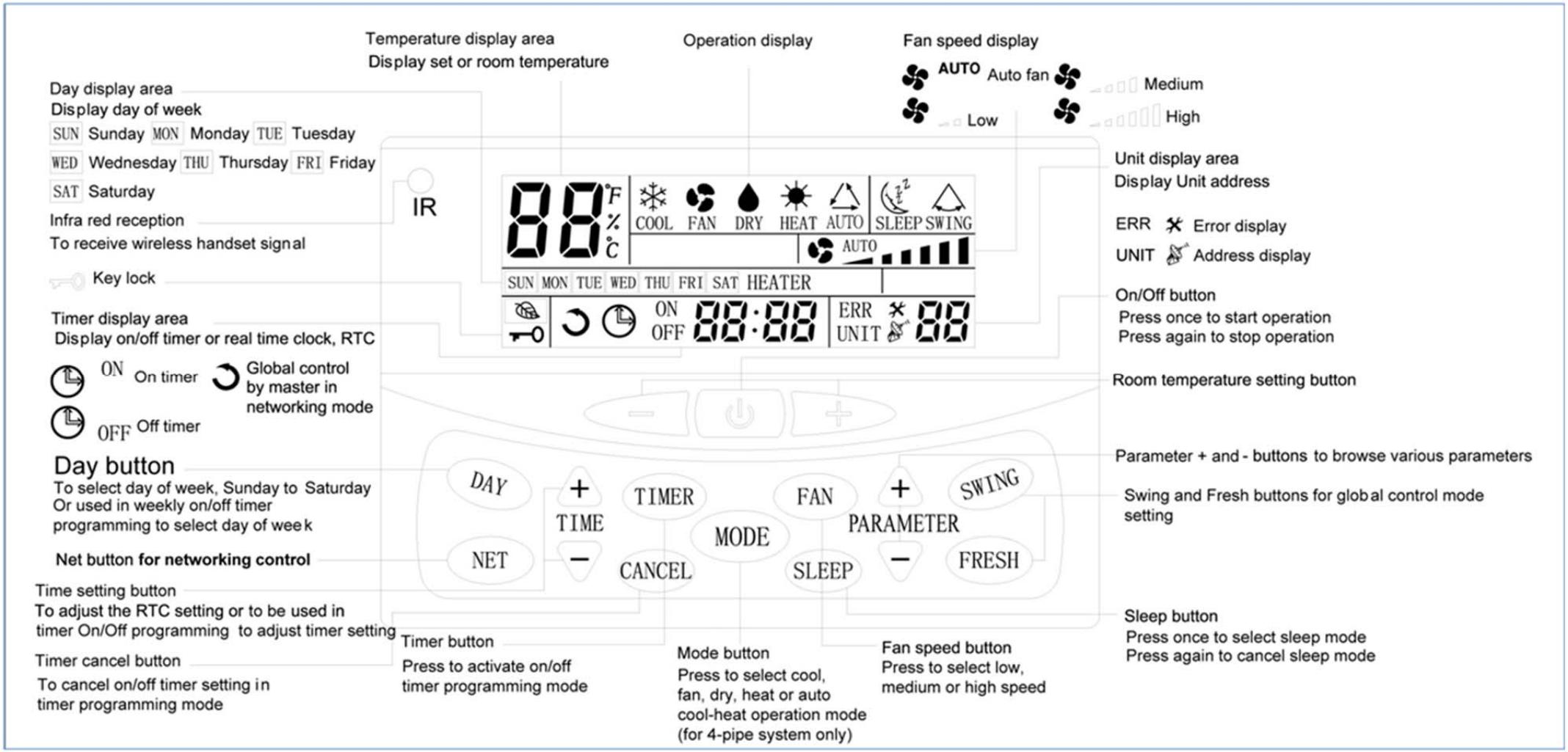
When unit with handset is the master unit, its settings are automatically sent to the slave units;

Auto Cool-Heat operation will be applicable in 4-pipe system only.

"Swing" function is not applicable.

European version only uses degree C setting.

F.2. Wired Wall Pad



Attention

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

European version only uses degree C setting.

F.2.1. Wall Pad Operation Guidelines

a) Clock display and setting

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

b) Day display and setting

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

c) Timer ON/OFF setting

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

1. Press TIMER button once, and ON symbol blinking indicates ON timer programming mode. The day display area indicates which day the timer is being set for. If there is no preset ON timer for this day, the timer display area shows --:--, otherwise the previous timer setting will be shown. Press TIME or TIME buttons to change the ON timer setting. Press CANCEL key to cancel the current ON timer setting and the timer display area will show --:--. Press DAY button to change the day the ON timer is to be programmed for.
2. Press TIMER button again. and OFF symbol blinking indicates OFF timer programming mode. The setting method is the same as the ON timer setting above.
3. Press TIMER button again to exit the ON/OFF timer setting function.
4. Should there be any ON or OFF timer settings programmed, will light up. Should there be any unexecuted ON or OFF timer settings for the current day, its corresponding ON or OFF icon will light up.
5. Hold down CANCEL button for 3 seconds to cancel all timer settings..

d) Timer set by master unit is as follows:

1. Press NET button to enter into networking control mode. Unit area blinking indicates the slave unit under control. Press TIME or TIME to select the desired slave unit. Units that are off will be skipped automatically.
2. Press TIMER button once to enter into ON timer programming mode. Press DAY button to select the required day of the week. Master unit will then retrieve the setting from the selected slave unit and the timer display area will show “rEAd”. The ON timer setting will be shown upon reading the data successfully. Press TIME or TIME button to change the ON timer setting of the slave unit.
3. Press TIMER button again to enter into OFF timer programming mode. Press DAY button to select the required day of the week. Master unit will then retrieve the setting from the selected slave unit and the timer

display area will show “rEAd”. The OFF timer setting will be shown upon reading the data successfully. Press TIME or TIME button to change the OFF timer setting of the slave unit.

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

In Global control mode:

i. Pressing the master unit’s CANCEL button for 3 seconds will cancel all timer settings in all slave units.
ii. Timer settings will be broadcast to all slave units.

e) Clock synchronization by master unit is as follows:

Press TIME and TIME buttons for 3 seconds to activate clock synchronization in all slave units. Master wall pad will respond with a beeping sound.

f) Key lock

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

g) Swing

Press SWING button to activate or deactivate swing function.

h) Sleep

Press SLEEP button to activate or deactivate sleep setting. The sleep function is valid in cool or heat modes only.

i) Temperature setting

Press or to enter into temperature setting mode. The temperature display area blinks indicating the current set temperature. Press the above buttons to adjust the set temperature.

j) Mode setting

Press MODE button to change the operation mode.

k) Fan speed setting

Press FAN button to change the fan speed. Only low speed is available for dehumidification mode.

l) On/Off control

Press to start or stop the air conditioner.

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

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

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

n) Unit operation parameters browsing

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

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

Press CANCEL button to exit.

o) Error indication

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

Error code definition:

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

G. Sensor Resistance R-T Conversion Table

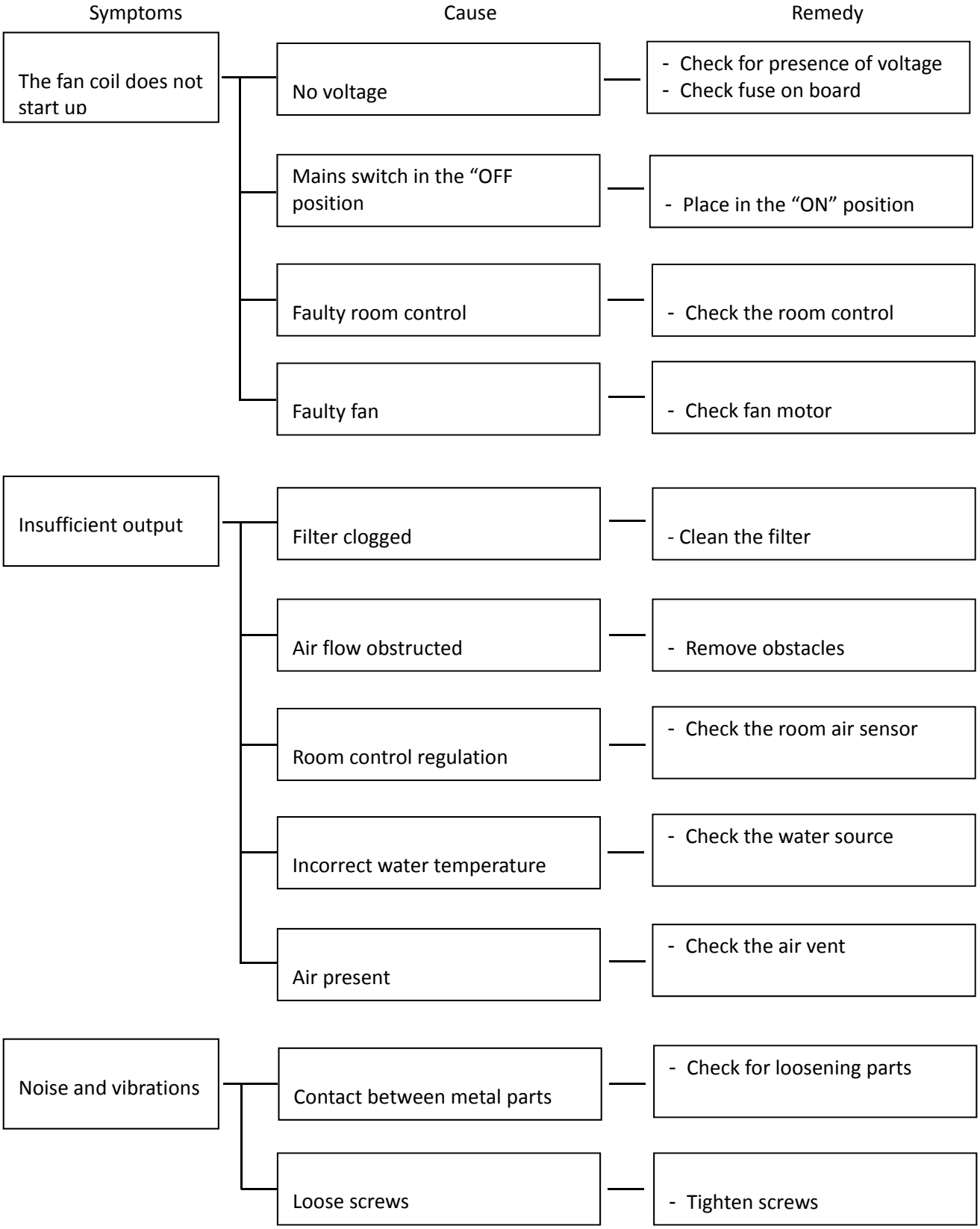
Resistance : R (25°C) = 10KΩ ± 1%
Beta Constant : B (25/85) = 3977 ± 1%

T	Rmin	Rnom	Rmax	T	Rmin	Rnom	Rmax
(°C)	(KΩ)	(KΩ)	(KΩ)	(°C)	(KΩ)	(KΩ)	(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	3402	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°C) = 10KΩ ± 1%
Beta Constant : B (25/85) = 3977 ± 1%

T	Rmin	Rnom	Rmax	T	Rmin	Rnom	Rmax
(°C)	(KΩ)	(KΩ)	(KΩ)	(°C)	(KΩ)	(KΩ)	(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				

H. Troubleshooting



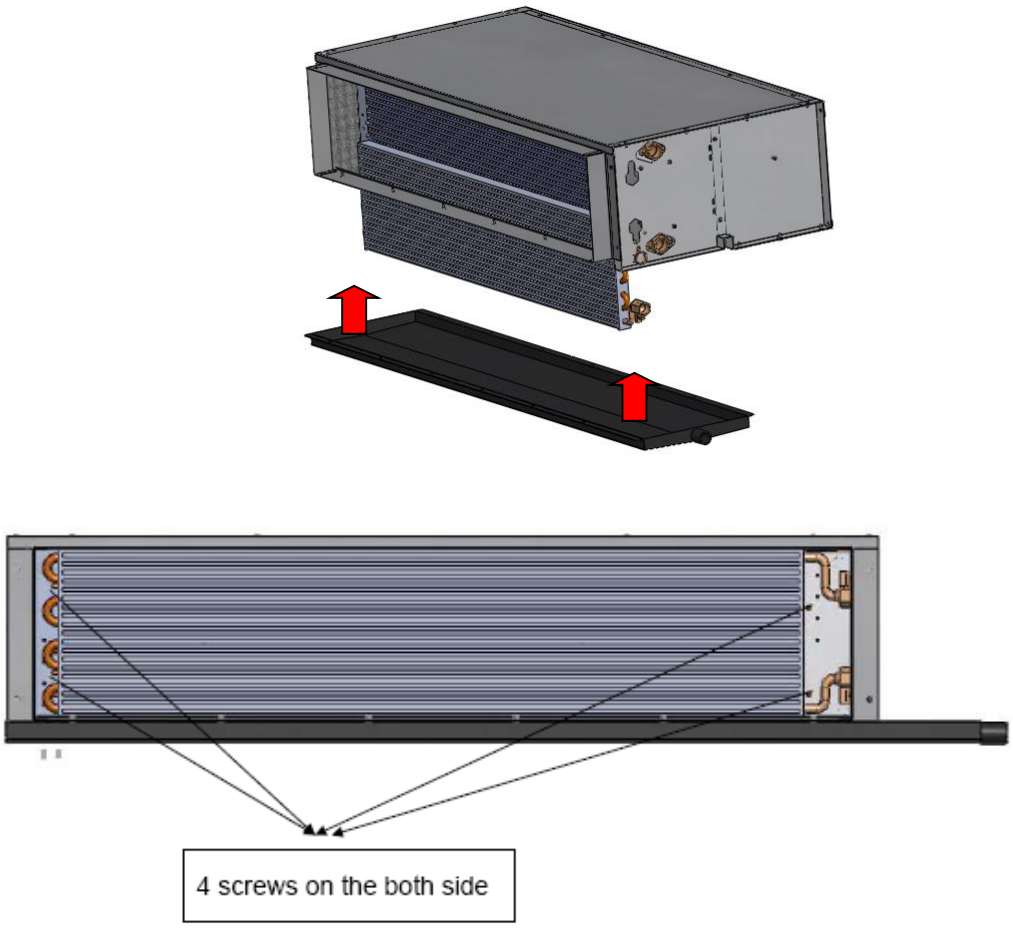
I. Spare Parts and Sub-assembly Descriptions

ACCESSORIES / CONFIGURATIONS

ACCESSORIES / CONFIGURATIONS			
Item	**Code**	**Description**	**QTY**
Control accessories			
1	**SK-NCPDWL-001b-001**	Full PCB control box for FDHD and FDLD-06-18 with 1 motor	1
2	**SK-NCPDWL-001b-002**	Full PCB control box for FDLD-24-40 with 2 motors	1
3	**SK-DFPS-A-002.1**	Infra-red handset and wall-holder	1
4	**SK-DFPS-A-002.2**	Wired wall-pad controller	1
5	**SK-DFPS-A-002.3**	LED receiver in ABS housing with 0.5m (19.7') pre-wiring	
Valve accessories			
6	**SK-DFPS-A-003a**	2-way 1/2" valve with thermoelectric actuator	1
7	**SK-DFPS-A-003b**	3-way 1/2” valve with thermoelectric actuator	1
8	**SK-DFPS-A-003c**	2-way 3/4” valve with thermoelectric actuator	1
9	**SK-DFPS-A-003d**	3-way 3/4” valve with thermoelectric actuator	1
10	**SK-DFPS-A-004a**	2-way 3/4” valve with solenoid actuator	1
11	**SK-DFPS-A-004b**	3-way 3/4” valve with solenoid actuator	1
12	**SK-DFPS-A-005a**	2-way 3/4” ball valve with motorized actuator	1
13	**SK-DFPS-A-005b**	3-way 3/4” ball valve with motorized actuator	1
14	**SK-DFPS-DL-010a**	Stainless steel hose piping connection kit for **SK-DFPS-A-003c**	1
15	**SK-DFPS-DL-010b**	Stainless steel hose piping connection kit for **SK-DFPS-A-003d**	1
16	**SK-DFPS-DL-010c**	Copper piping connection kit for **SK-DFPS-A-003a**	1
17	**SK-DFPS-DL-010d**	Copper piping connection kit for **SK-DFPS-A-003b**	1
Heating coil accessories			
18	**SK-DFPS-DL/FS-009a**	Auxiliary 1-row heating coil	1
19	**SK-DFPS-DL/FS-009b**	Auxiliary 1-row heating coil	1
20	**SK-DFPS-DL/FS-009c**	Auxiliary 1-row heating coil	1
21	**SK-DFPS-DL/FS-009d**	Auxiliary 1-row heating coil	1
22	**SK-DFPS-DL/FS-009e**	Auxiliary 1-row heating coil	1
23	**SK-DFPS-DL/FS-N009f**	Auxiliary 1-row heating coil	1
24	**SK-DFPS-DL/FS-009g**	Auxiliary 1-row heating coil	1
25	**SK-DFPS-DL/FS-009h**	Auxiliary 1-row heating coil	1
26	**SK-DFPS-DL/FS-009i**	Auxiliary 1-row heating coil	1
Electrical Heater accessories			
27	**SK-DFPS-DL-005Sa**	1 kW (3,400 BTU/H) PTC electric heat module for ~S configuration.	1
28	**SK-DFPS-DL-005Sb**	1.5 kW (5,100 BTU/H) PTC electric heat module for ~S configuration.	1
29	**SK-DFPS-DL-005Sc**	2 kW (6,800 BTU/H) PTC electric heat module for ~S configuration.	1
30	**SK-DFPS-DL-005Sd**	2.5 kW (8,500 BTU/H) PTC electric heat module for ~S configuration.	1
31	**SK-DFPS-DL-005Se**	3 kW (10,200 BTU/H) PTC electric heat module for ~S configuration.	1
32	**SK-DFPS-DL-005Ta**	1 kW (3,400 BTU/H) PTC electric heat module for ~T configuration.	1
33	**SK-DFPS-DL-005Tb**	1.5 kW (5,100 BTU/H) PTC electric heat module for ~T configuration.	1
34	**SK-DFPS-DL-005Tc**	2 kW (6,800 BTU/H) PTC electric heat module for ~T configuration.	1
35	**SK-DFPS-DL-005Td**	2.5 kW (8,500 BTU/H) PTC electric heat module for ~T configuration.	1
36	**SK-DFPS-DL-005Te**	3 kW (10,200 BTU/H) PTC electric heat module for ~T configuration.	1
Structure accessories			
37	**SK-DFPS-DL-013**	PRM discharge plenum	1
38	**SK-DFPS-DL-014**	PRA intake plenum	1
39	**SK-DPPS-DL-015**	PR90M discharge plenum	1
40	**SK-DPPS-DL-016**	PR90A intake plenum	1
41	**SK-DPPS-DL-017**	PRCM discharge plenum with circular fittings, internal heat and sound insulation	1
42	**SK-DPPS-DL-018**	PRCA intake plenum with circular fittings and air filter	1

J. Module Layout

SK-DFPS-DL/FS-009 Auxiliary 1-row heating coil



Note: Use 4 screws to add or remove the auxiliary coil on the main coil.

SK-DFPS-DL-005 PTC electric heat module

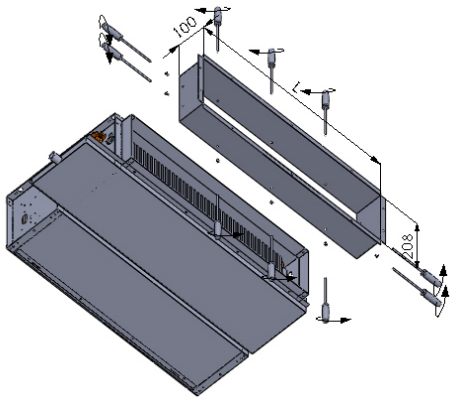
The electric heater module is supplied for winter heating as an alternative to the auxiliary hot water coil. The electric heater is installed in the same way and in the same position as the auxiliary 1 row heating coil for the 4-pipe system.

Note: For correct operation of the heater, airflow should not drop below the minimum fan speed values.

J.1. Installation Accessories

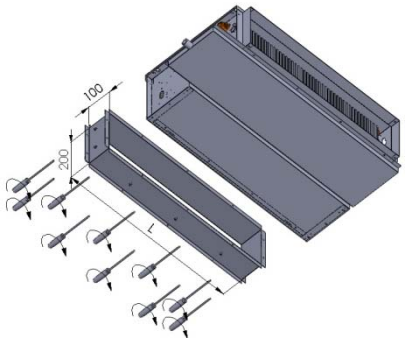
SK-DFPS-DL-013 PRM discharge plenum

FDLD(3R) / FDLD(4R)		06	09	12	15	18	24	30	36	40
Code		DL-013a	DL-013b	DL-013c	DL-013d	DL-013e	DL-013f	DL-013g	DL-013h	DL-013i
L	mm	548	598	748	898	948	1448	1448	1598	1798



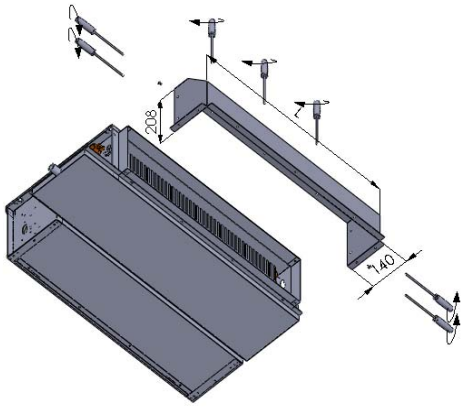
SK-DFPS-DL-014 PRA intake plenum

FDLD(3R) / FDLD(4R)		06	09	12	15	18	24	30	36	40
Codes		DL-014a	DL-014b	DL-014c	DL-014d	DL-014e	DL-014f	DL-014g	DL-014h	DL-014i
L	mm	548	598	748	898	948	1448	1448	1598	1798



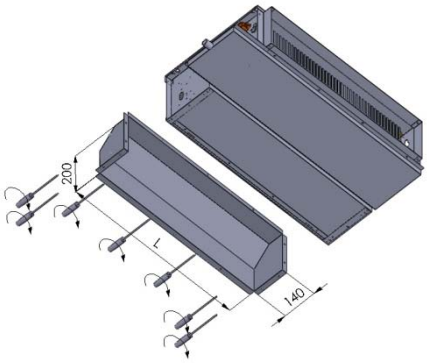
SK-DFPS-DL-015 PR90M discharge plenum

FDLD(3R) / FDLD(4R)		06	09	12	15	18	24	30	36	40
Codes		DL-015a	DL-015b	DL-015c	DL-015d	DL-015e	DL-015f	DL-015g	DL-015h	DL-015i
L	mm	548	598	748	898	948	1448	1448	1598	1798



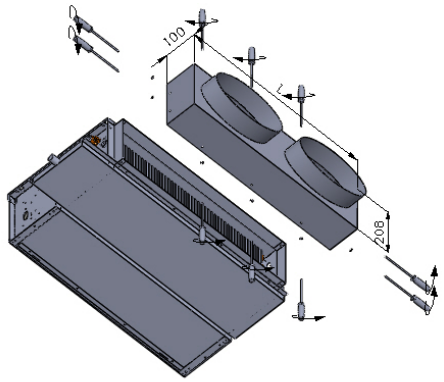
SK-DFPS-DL-016 PR90A intake plenum

FDLD(3R) / FDLD(4R)		06	09	12	15	18	24	30	36	40
Codes		DL-016a	DL-016b	DL-016c	DL-016d	DL-016e	DL-016f	DL-016g	DL-016h	DL-016i
L	mm	548	598	748	898	948	1448	1448	1598	1798



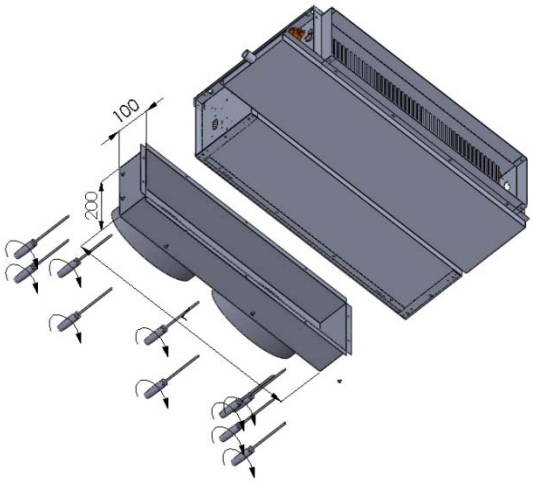
SK-DFPS-DL-017 PRCM discharge plenum with circular fittings, internal heat and sound insulation

FDLD(3R) / FDLD(4R)		06	09	12	15	18	24	30	36	40
Codes		DL-017a	DL-017b	DL-017c	DL-017d	DL-017e	DL-017f	DL-017g	DL-017h	DL-017i
L	mm	548	598	748	898	948	1448	1448	1598	1798
ϕ	mm	200								
S	N°	2	2	3	4	4	5	5	6	6



SK-DFPS-DL-018 PRCA intake plenum with circular fittings and air filter

FDLD(3R) / FDLD(4R)		06	09	12	15	18	24	30	36	40
codes		DL-018a	DL-018b	DL-018c	DL-018d	DL-018e	DL-018f	DL-018g	DL-018h	DL-018i
L	mm	548	598	748	898	948	1448	1448	1598	1798
ϕ	mm	210								
S	N°	2	2	3	4	4	5	5	6	6

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