TECHNICAL CATALOGUE

HITACHI

Cooling & Heating

RAS-SH09RHLAE
RAS-SH12RHLAE

RAC-SH09WHLAE

RAS-SH18RHLAE
RAS-SH24RHLAE

RAC-SH12WHLAE

RAC-SH18WHLAE
RAC-SH24WHLAE

HITACHI

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Whilst every effort is made to ensure that all dimensions and specifications are correct, any printers' error not rectified are outside the control of HITACHI, who cannot be held responsible for the same

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1 SPECIFICATIONS

1.1. WALL TYPE (RAS-SH09RHLAE/RAC-SH09WHLAE, RAS-SH12RHLAE/RAC-SH12WHLAE)

Indoor Model No			RAS-SH09RHLAE	RAS-SH12RHLAE
Outdoor Model No			RAC-SH09WHLAE	RAC-SH12WHLAE
Rated Performance	System Type		Heat Pump	Heat Pump
	Rated Cooling Capacity	BTU/h	9000	12000
	Cooling Capacity (Min-Max)	BTU/h	5100 - 10500	5150 - 14000
	Rated Heating Capacity	BTU/h	11000	14000
	Heating Capacity (Min-Max)	BTU/h	5450 - 15000	5500 - 18000
	EER		14	12.5
	SEER		20	20
	HSPF		11.5	11
	COP at 47°F		3.9	3.8
	COP at 17°F		2.5	2.5
	COP at 5°F		2.25	2.25
	Heating Capacity at+17 F (-8 C)	BTU/h	9650	12300
	Heating Capacity at +5 F (-15 C)	BTU/h	8050	10000
	Heating Capacity at -4 F (-20 C)	BTU/h	7000	8600
	Moisture Removal	GPH (l/h)	0.26(1.0)	0.40(1.5)
Electrical Data	Rated Voltage	V-Ph-Hz	208-230/1/60	208-230/1/60
	Rated Cooling Current	Amps	2.90	4.20
	Rated Heating Current	Amps	3.80	5.00
	MCA	Amps	12	12
	MOCP	Amps	15	15
Indoor Unit	Set Temp Range	^{O}F (^{O}C)	60^{O}F-90^{O}F (16^{O}C-32^{O}C)	60^{O}F-90^{O}F (16^{O}C-32^{O}C)
	Airflow (H/M/L/SL)	CFM	320/280/200/150	400/280/200/150
	Sound Pressure Level (H/M/S/SL)	dB(A)	43/40/35/27	46/40/35/27
	Unit Dimension (WxHxD)	inch (mm)	35.43x11.81x9.05 (900x300x230)	35.43x11.81x9.05 (900x300x230)
	Packaging Dimension (WxHxD)	Inch (mm)	38.19x11.81x14.17 (970 x 300 x 360)	38.19x11.81x14.17 (970 x 300 x 360)
	Net / Gross Weight	lbs (kg)	24.3/28.7 (11/13)	24.3/28.7 (11/13)
Outdoor Unit	Operation Range - Cooling	^{O}F (^{O}C)	-0.4^{O}F to 114.8^{O}F (-18^{O}C to +46^{O}C)	-0.4^{O}F to 114.8^{O}F (-18^{O}C to +46^{O}C)
	Operation Range - Heating	^{O}F (^{O}C)	-13^{O}F to 75.2^{O}F (-25^{O}C to +24^{O}C)	-13^{O}F to 75.2^{O}F (-25^{O}C to +24^{O}C)
	Refrigerant		R410A	R410A
	Refrigerant Charge	oz (Kg)	40.57(1.15)	40.57(1.15)
	Sound Pressure Level (High)	dB(A)	52	52
	Unit Dimension (WxHxD)	inch (mm)	29.52x22.44x11.02 (750x570x280)	29.52x22.44x11.02 (750x570x280)

	Packaging Dimension (WxHxD)	Inch (mm)	35.98x24.80x15.59 (914 x 630 x 396)	35.98x24.80x15.59 (914 x 630 x 396)
	Net / Gross Weight	lbs (kg)	72.8/78.3 (33/35.5)	72.8/78.3 (33/35.5)
Piping	Max Total Piping Length	Ft (m)	82.0ft (25)	82.0ft (25)
	Max Total Piping Height	Ft (m)	49.2ft (15)	49.2ft (15)
	Piping Connection - Liquid	inch	1/4	1/4
	Piping Connection - Gas	inch	3/8	3/8
	Piping Connection - Drain	inch	Dia-0.657	Dia-0.657

1.2. WALL TYPE (RAS-SH18RHLAE/RAC-SH18WHLAE, RAS-SH24RHLAE/RAC-SH24WHLAE)

Indoor Model No			RAS-SH18RHLAE	RAS-SH24RHLAE
Outdoor Model No			RAC-SH18WHLAE	RAC-SH24WHLAE
Rated Performance	Ssytem Type		Heat Pump	Heat Pump
	Rated Cooling Capacity	BTU/h	18000	22000
	Cooling Capacity (Min-Max)	BTU/h	6600-20500	9700-25000
	Rated Heating Capacity	BTU/h	21500	25000
	Heating Capacity (Min-Max)	BTU/h	7100-26000	8500 - 29500
	EER		12.5	12.5
	SEER		22	20
	HSPF		11	11
	COP at 47°F		3.8	3.7
	COP at 17°F		2.4	2.4
	COP at 5°F		2.25	2.25
	Heating Capacity at+17 F (-8 C)	BTU/h	18300	21250
	Heating Capacity at +5 F (-15 C)	BTU/h	15400	18250
	Heating Capacity at -4 F (-20 C)	BTU/h	13200	15500
	Moisture Removal	GPH (l/h)	0.48 (1.8)	0.66 (2.5)
Electrical Data	Rated Voltage	V-Ph-Hz	208-230/1/60	208-230/1/60
	Rated Cooling Current	Amps	5.90	7.40
	Rated Heating Current	Amps	7.00	8.50
	MCA	Amps	17	20
	MOCP	Amps	20	20
Indoor Unit	Set Temp Range	^{O}F (^{O}C)	60^{O}F-90^{O}F (16^{O}C-32^{O}C)	60^{O}F-90^{O}F (16^{O}C-32^{O}C)
	Airflow (H/M/L/SL)	CFM	540/410/320/260	650/500/405/299
	Sound Pressure Level (H/M/S/SL)	dB(A)	49/45/42/35	52/47/43/36
	Unit Dimension (WxHxD)	inch (mm)	43.3x11.81x10.23 (1100x300x260)	43.3x11.81x10.23 (1100x300x260)
	Packaging Dimension (WxHxD)	Inch (mm)	45.47x12.99x14.37 (1155 x330 x365)	45.47x12.99x14.37 (1155 x330 x365)
	Net / Gross Weight	lbs (kg)	33.1/37.5 (15/17)	33.1/37.5 (15/17)
Outdoor Unit	Operation Range - Cooling	^{O}F (^{O}C)	-0.4^{O}F to 114.8^{O}F (-18^{O}C to +46^{O}C)	-0.4^{O}F to 114.8^{O}F (-18^{O}C to +46^{O}C)
	Operation Range - Heating	^{O}F (^{O}C)	-13^{O}F to 75.2^{O}F (-25^{O}C to +24^{O}C)	-13^{O}F to 75.2^{O}F (-25^{O}C to +24^{O}C)
	Refrigerant		R410A	R410A
	Refrigerant Charge	oz (Kg)	56.4(1.6)	72.3(2.05)
	Sound Pressure Level (High)	dB(A)	53	53
	Unit Dimension (WxHxD)	inch (mm)	33.46x31.49x11.73 (850x800x298)	33.46x31.49x11.73 (850x800x298)
	Packaging Dimension (WxHxD)	Inch (mm)	39.69x33.39x15.91 (1008 x 848 x 404)	39.69x33.39x15.91 (1008 x 848 x 404)

	Net / Gross Weight	lbs (kg)	111.3/121.3 (50.5/55)	111.3/121.3 (50.5/55)
Piping	Max Total Piping Length	Ft (m)	82.0ft (25)	82.0ft (25)
	Max Total Piping Height	Ft (m)	49.2ft (15)	49.2ft (15)
	Piping Connection - Liquid	inch	1/4	1/4
	Piping Connection - Gas	inch	1/2	5/8
	Piping Connection - Drain	inch	Dia-0.657	Dia-0.657

NOTE:

1. Capacity and seasonal performance data (SEER/HSPF) are based on AHRI 210-240. The normminal heating and cooling capacity is the combined capacity of the HITACHI Split system (Indoor + Outdoor Unit).

Operation Conditions		***Cooling***	***Heating***
Indoor Air Inlet Temperature	***dB***	*80 °F*	*70 °F*
	WB	*67 °F*	
Outdoor Air Inlet Temperature	***dB***	*95 °F*	*47 °F*
	WB		*43 °F*
***Piping Length**: 16.4f (5.0 meters); **Piping Lift**: 0f (0 meter)* ***dB**: Dry Bulb; **WB**: Wet Bulb*			

2. The Sound Pressure Level is based on the following conditions:

INDOOR
- 2.62ft (0.8 meter) beneath indoor height center
- 3.28ft (1 meter) from Discharge grille

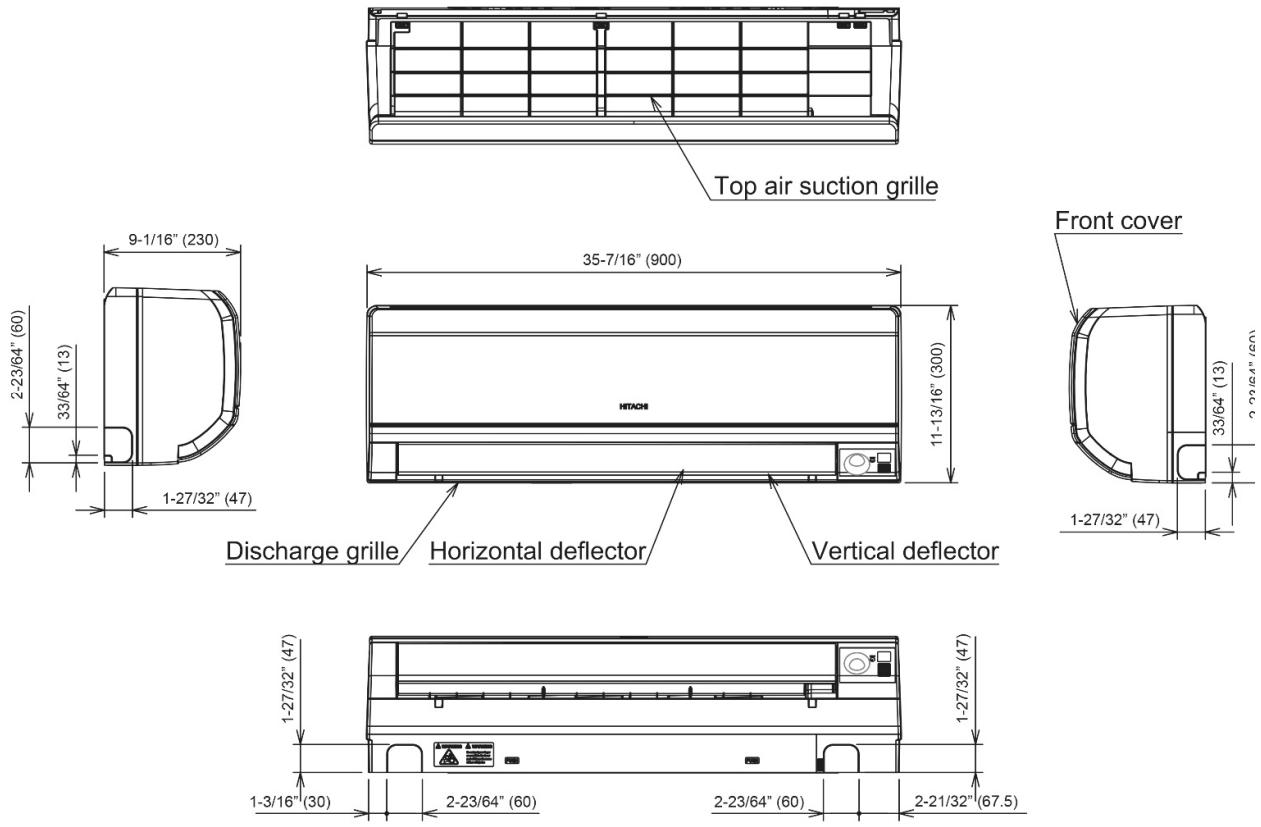
OUTDOOR
- 3.28ft (1 meter) from the unit front surface and 3.28ft (1 meter) from floor level.

The above data was measured in an anechoic chamber. Please take into consideration reflected sound of your specific site

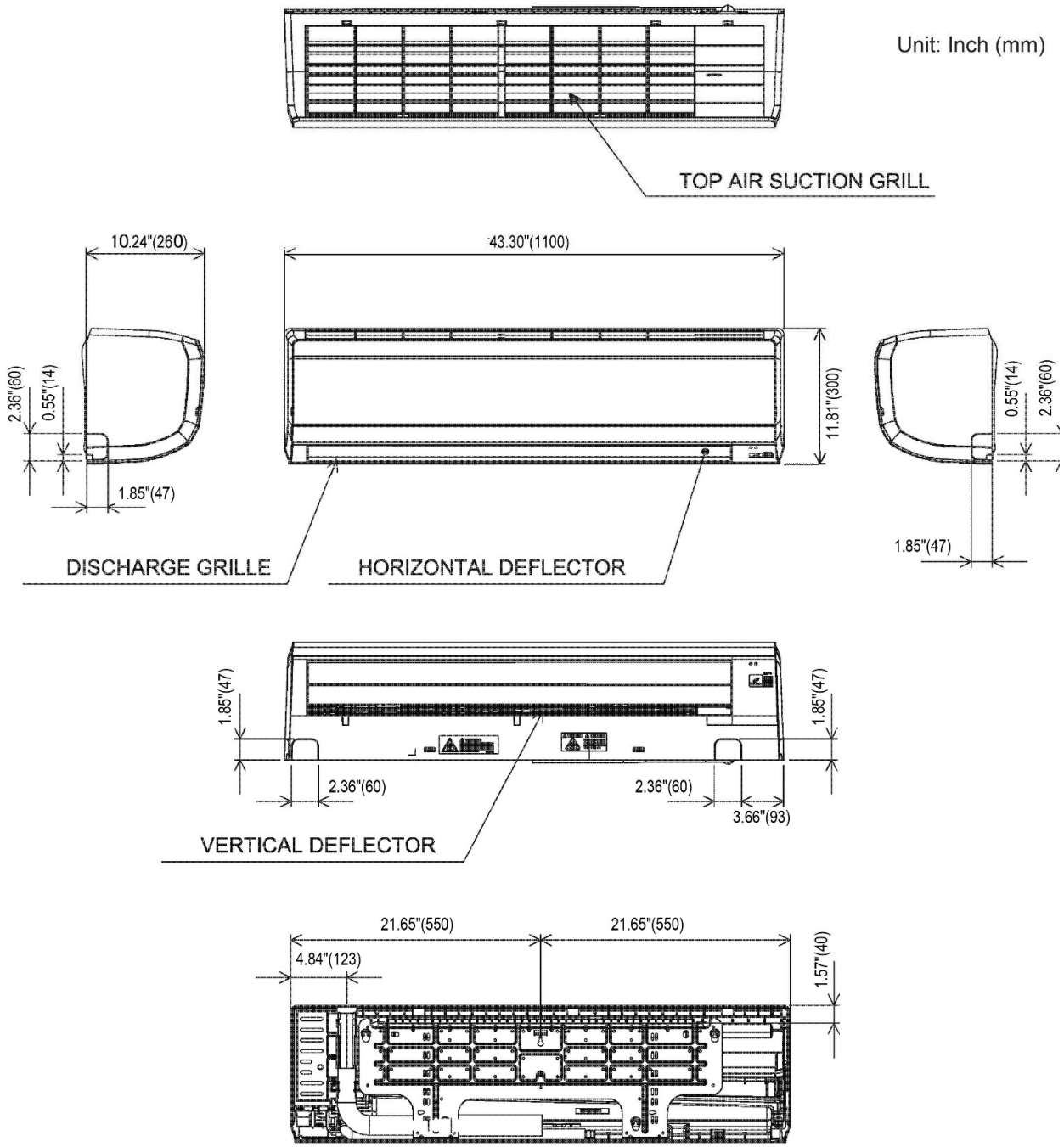
2 DIMENSIONAL DATA

2.1. INDOOR WALL TYPE: RAS-SH09RHLAE, RAS-SH12RHLAE

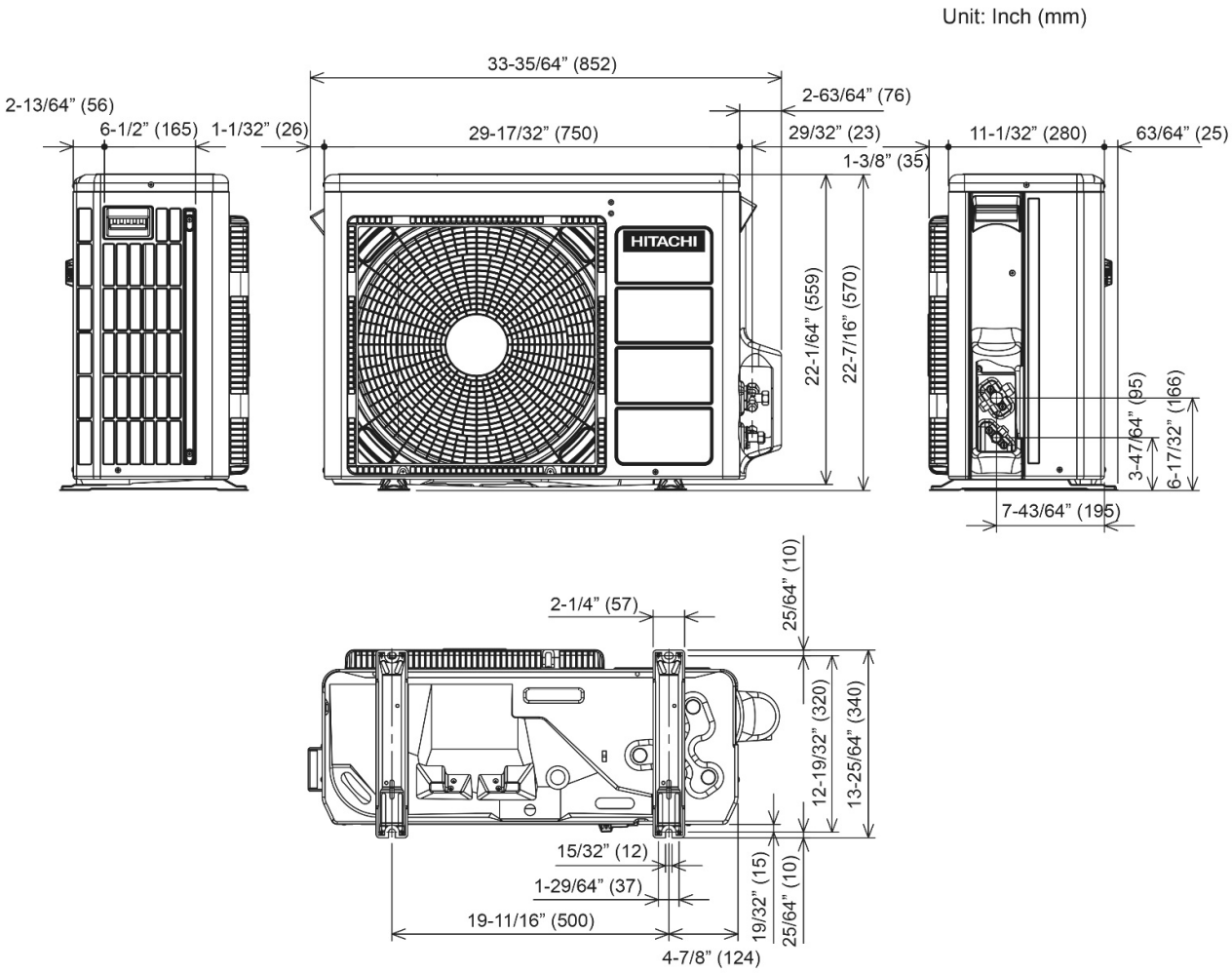
Unit: Inch (mm)



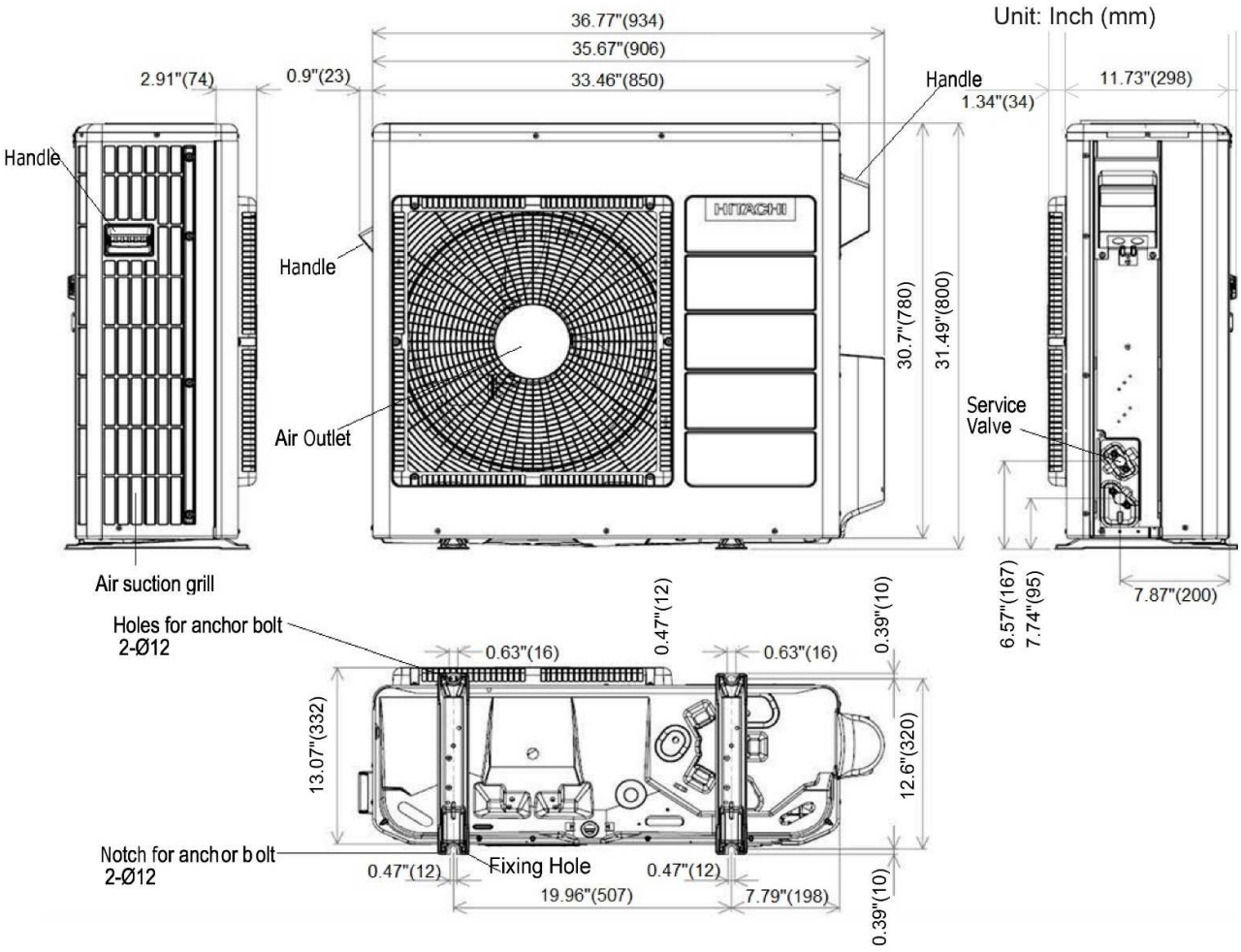
2.3. INDOOR WALL TYPE: RAS-SH18RHLAE, RAS-SH24RHLAE



2.5. OUTDOOR: RAC-SH09WHLAE, RAC-SH12WHLAE



2.6. OUTDOOR: RAC-SH18WHLAE, RAC-SH24WHLAE



3 CAPACITIES TABLE

3.1. CAPACITY CHARACTERISTIC CURVES

The following charts show the characteristics of outdoor unit capacity, which corresponds with the operating ambient temperature of outdoor unit.

Conditions:
①Pipe length / height difference:16.4ft (5m) / 0ft (0m) ③Capacity loss due to white frost and defrost operation is not included.
②Indoor fan speed at High mode

3.1.1. RAS-SH09RHLAE/RAC-SH09WHLAE

COOLING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
EWB	EDB	14			70			81			90			95			104			110		
°F	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
54	64	5242	4103	280	8460	7796	474	7830	7196	558	7380	6822	616	7110	6522	643	6660	6147	690	6390	5847	717
57	68	5242	4103	280	9090	7796	474	8460	7271	565	7920	6822	623	7650	6597	650	7110	6147	697	6840	5922	730
61	72	5242	4366	284	9720	7796	480	9000	7271	571	8460	6822	630	8190	6597	663	7650	6147	710	7380	5922	737
64	77	5621	4682	289	10350	8471	486	9540	7871	578	9000	7421	637	8640	7121	663	8100	6672	717	7740	6372	744
66	81	5811	4840	293	10710	8920	492	9900	8246	584	9360	7796	643	9000	7496	670	8460	7046	717	8100	6747	744
72	86	6442	4787	293	11880	8845	492	10980	8171	584	10350	7721	650	9990	7421	677	9000	7196	744	8370	7046	784
75	90	6884	4787	297	12690	8845	498	11700	8171	591	11070	7721	650	10620	7421	683	9360	7346	764	8550	7271	811

HEATING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
	EDB	5			14			23			32			47			50			59		
	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	61	3960	0	651	6270	0	669	7733	0	716	9416	0	802	11121	0	812	12133	0	834	14003	0	876
	64	3905	0	660	6215	0	678	7656	0	735	9317	0	822	11066	0	854	12089	0	871	13948	0	917
	68	3850	0	669	6160	0	686	7590	0	748	9240	0	836	11000	0	880	11825	0	911	13860	0	959
	72	3795	0	678	6105	0	695	7480	0	767	9141	0	856	10934	0	915	11957	0	944	13794	0	999
	75	3740	0	686	6050	0	704	7414	0	786	9064	0	876	10868	0	950	11891	0	980	13596	0	1039

EWB: Evaporator Wet Bulb temperature (°F)
EDB: Evaporator Dry Bulb temperature (°F)
(°FDB): Outdoor Unit Inlet Air Dry Temperature (°F)

TC: Total Capacity (BTU)
SHC: Sensible Heating Capacity (BTU)
PI: Power Input

3.1.2. RAS-SH12RHLAE/RAC-SH12WHLAE

COOLING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
EWB	EDB	14			70			81			90			95			104			110		
°F	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
54	64	5533	4002	322	10340	8804	632	9570	8127	744	9840	8404	897	9480	8035	936	8880	7573	1004	8520	7203	1043
57	68	5533	4002	322	11110	8804	632	10340	8212	753	10560	8404	907	10200	8127	946	9480	7573	1014	9120	7296	1063
61	72	5533	4258	327	11880	8804	640	11000	8212	762	11280	8404	917	10920	8127	965	10200	7573	1034	9840	7296	1073
64	77	5933	4566	332	12650	9566	648	11660	8889	771	12000	9143	926	11520	8773	965	10800	8219	1043	10320	7850	1082
66	81	6133	4720	338	13090	10074	657	12100	9312	780	12480	9605	936	12000	9235	975	11280	8681	1043	10800	8312	1082
72	86	6800	4669	338	14520	9989	657	13420	9227	780	13800	9512	946	13320	9143	985	12000	8866	1082	11160	8681	1141
75	90	7267	4669	343	15510	9989	665	14300	9227	788	14760	9512	946	14160	9143	995	12480	9050	1112	11400	8958	1180

HEATING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
	EDB	5			14			23			32			47			50			59		
	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	61	5040	0	858	7980	0	882	9842	0	944	11984	0	1057	14154	0	1071	15442	0	1100	17822	0	1154
	64	4970	0	870	7910	0	893	9744	0	969	11858	0	1083	14084	0	1125	15386	0	1148	17752	0	1209
	68	4900	0	882	7840	0	905	9660	0	986	11760	0	1102	14000	0	1160	15050	0	1201	17640	0	1264
	72	4830	0	893	7770	0	916	9520	0	1012	11634	0	1129	13916	0	1206	15218	0	1245	17556	0	1317
	75	4760	0	905	7700	0	928	9436	0	1036	11536	0	1155	13832	0	1253	15134	0	1292	17304	0	1370

EWB: Evaporator Wet Bulb temperature (°F)
EDB: Evaporator Dry Bulb temperature (°F)
(°FDB): Outdoor Unit Inlet Air Dry Temperature (°F)

TC: Total Capacity (BTU)
SHC: Sensible Heating Capacity (BTU)
PI: Power Input

3.1.3. RAS-SH18RHLAE/RAC-SH18WHLAE

COOLING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
EWB	EDB	14			70			81			90			95			104			110		
°F	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
54	64	7662	6068	418	12798	11934	732	11845	11016	863	14760	13805	1260	14220	13198	1315	13320	12439	1411	12780	11833	1466
57	68	7662	6068	418	13752	11934	732	12798	11131	873	15840	13805	1274	15300	13350	1329	14220	12439	1425	13680	11984	1493
61	72	7662	6457	425	14705	11934	742	13615	11131	884	16920	13805	1288	16380	13350	1356	15300	12439	1452	14760	11984	1507
64	77	8215	6924	431	15658	12967	752	14432	12049	894	18000	15018	1302	17280	14412	1356	16200	13501	1466	15480	12895	1521
66	81	8492	7157	438	16202	13655	761	14977	12622	904	18720	15777	1315	18000	15170	1370	16920	14260	1466	16200	13653	1521
72	86	9415	7079	438	17972	13540	761	16611	12508	904	20700	15625	1329	19980	15018	1384	18000	14563	1521	16740	14260	1603
75	90	10062	7079	444	19198	13540	771	17700	12508	914	22140	15625	1329	21240	15018	1397	18720	14867	1562	17100	14715	1658

HEATING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
	EDB	5			14			23			32			47			50			59		
	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	61	7740	0	1206	12255	0	1239	15115	0	1327	18404	0	1485	21737	0	1504	23715	0	1545	27370	0	1622
	64	7633	0	1223	12148	0	1255	14964	0	1361	18211	0	1522	21629	0	1581	23629	0	1614	27262	0	1698
	68	7525	0	1239	12040	0	1271	14835	0	1386	18060	0	1549	21500	0	1630	23113	0	1687	27090	0	1777
	72	7418	0	1255	11933	0	1288	14620	0	1421	17867	0	1586	21371	0	1695	23371	0	1749	26961	0	1850
	75	7310	0	1271	11825	0	1304	14491	0	1456	17716	0	1623	21242	0	1760	23242	0	1816	26574	0	1925

EWB: Evaporator Wet Bulb temperature (°F)
EDB: Evaporator Dry Bulb temperature (°F)
(°FDB): Outdoor Unit Inlet Air Dry Temperature (°F)

TC: Total Capacity (BTU)
SHC: Sensible Heating Capacity (BTU)
PI: Power Input

3.1.4. RAS-SH24RHLAE/RAC-SH24WHLAE

COOLING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
EWB	EDB	14			70			81			90			95			104			110		
°F	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
54	64	10287	7769	577	16311	14502	959	15096	13386	1130	18040	16088	1582	17380	15381	1651	16280	14497	1772	15620	13790	1840
57	68	10287	7769	577	17526	14502	959	16311	13526	1143	19360	16088	1600	18700	15558	1668	17380	14497	1789	16720	13967	1875
61	72	10287	8267	586	18740	14502	971	17352	13526	1157	20680	16088	1617	20020	15558	1703	18700	14497	1823	18040	13967	1892
64	77	11031	8865	595	19955	15757	984	18393	14641	1170	22000	17502	1634	21120	16795	1703	19800	15735	1840	18920	15027	1909
66	81	11403	9163	604	20649	16594	997	19087	15339	1183	22880	18386	1651	22000	17679	1720	20680	16619	1840	19800	15911	1909
72	86	12642	9064	604	22905	16454	997	21170	15199	1183	25300	18210	1668	24420	17502	1737	22000	16972	1909	20460	16619	2012
75	90	13510	9064	613	24466	16454	1009	22558	15199	1197	27060	18210	1668	25960	17502	1754	22880	17326	1961	20900	17149	2081

HEATING [60Hz, 230V]

INDOOR		OUTDOOR TEMPERATURE (°FDB)																				
	EDB	5			14			23			32			47			50			59		
	°F	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	61	9000	0	1462	14250	0	1501	17575	0	1608	21400	0	1799	25275	0	1823	27575	0	1872	31825	0	1965
	64	8875	0	1481	14125	0	1521	17400	0	1649	21175	0	1845	25150	0	1916	27475	0	1955	31700	0	2058
	68	8750	0	1501	14000	0	1541	17250	0	1679	21000	0	1876	25000	0	1975	26875	0	2044	31500	0	2153
	72	8625	0	1521	13875	0	1560	17000	0	1722	20775	0	1922	24850	0	2054	27175	0	2119	31350	0	2242
	75	8500	0	1541	13750	0	1580	16850	0	1764	20600	0	1967	24700	0	2133	27025	0	2200	30900	0	2332

EWB: Evaporator Wet Bulb temperature (°F)
EDB: Evaporator Dry Bulb temperature (°F)
(°FDB): Outdoor Unit Inlet Air Dry Temperature (°F)

TC: Total Capacity (BTU)
SHC: Sensible Heating Capacity (BTU)
PI: Power Input

3.2. CORRECTION FACTORS ACCORDING TO PIPING LENGTH

Correction Factor for **Cooling Capacity** according to Piping Length

The cooling capacity should be corrected according to the following formula:

CCA = CC x F

CCA: Actual Corrected Cooling Capacity (kcal/h)
CC: Cooling Capacity in the Performance Table (kcal/h)
F: Correction Factor Based on the Equivalent Piping Length

Correction Factor for **Heating Capacity** according to Piping Length

The heating capacity should be corrected according to the following formula:

HCA= HC x F

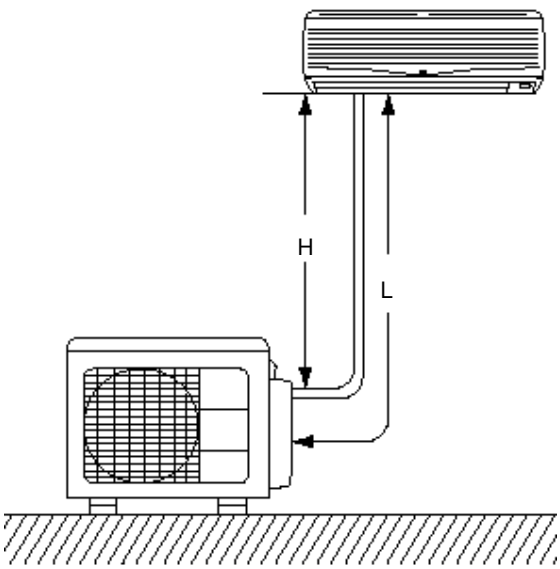
HCA: Actual Corrected Heating Capacity (kcal/h)
HC: Heating Capacity in the Performance Table (kcal/h)
F: Correction Factor Based on the Equivalent Piping Length

The correction factors are shown in the following figure.

Equivalent Piping Length for:

– One 90º Elbow is 1.64ft (0.5m)

– One 180º Curve is 4.92ft (1.5m)

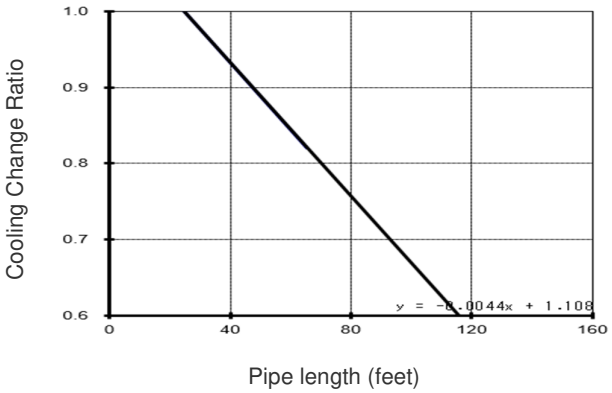


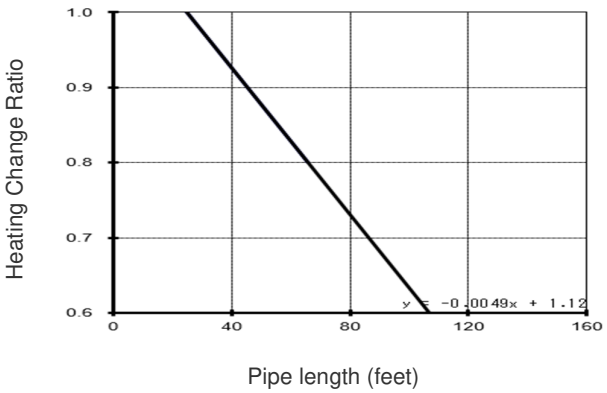
H: Vertical Distance Between Indoor Unit and Outdoor Units in feet

L: Actual One-Way Piping Length Between Indoor Unit and Outdoor Unit in feet

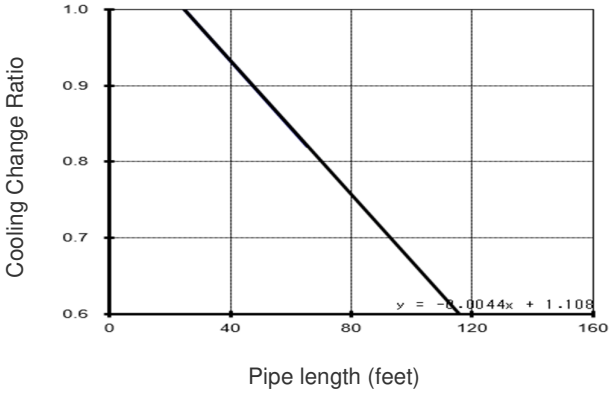
EL: Equivalent Total Distance Between Indoor Unit and Outdoor Unit in feet
(Equivalent One-Way Piping Length)

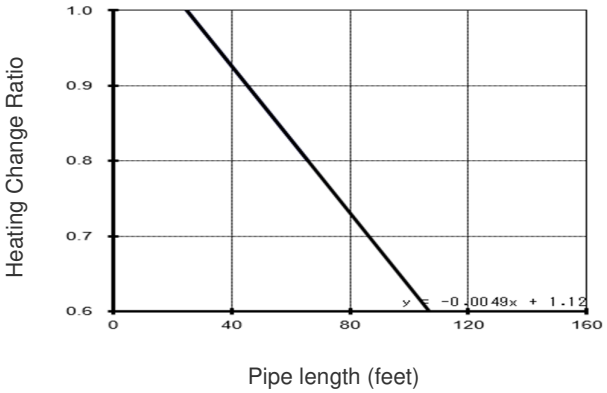
Models : RAC-SH09WHLAE



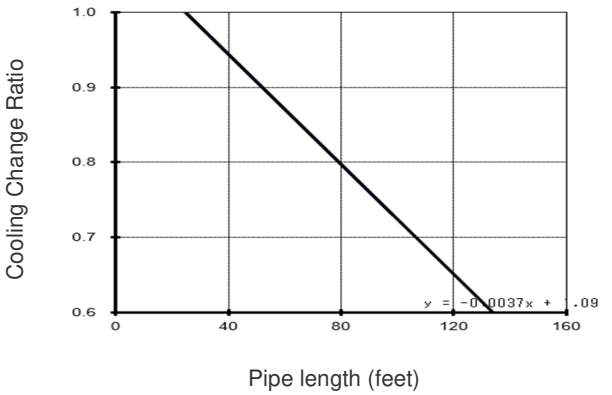


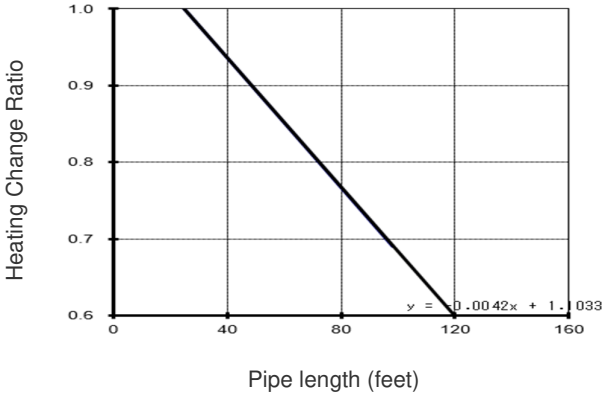
Models : RAC-SH12WHLAE



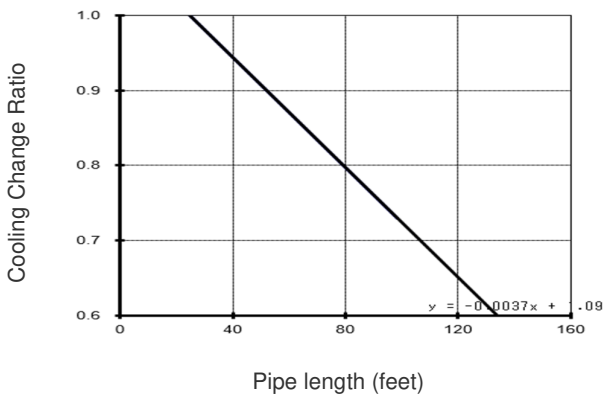


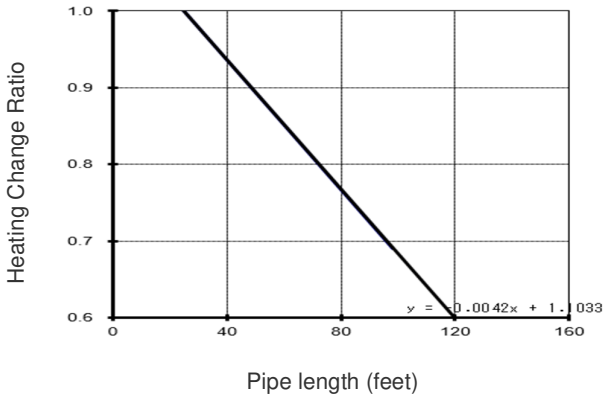
Models : RAC-SH18WHLAE





Models : RAC-SH24WHLAE





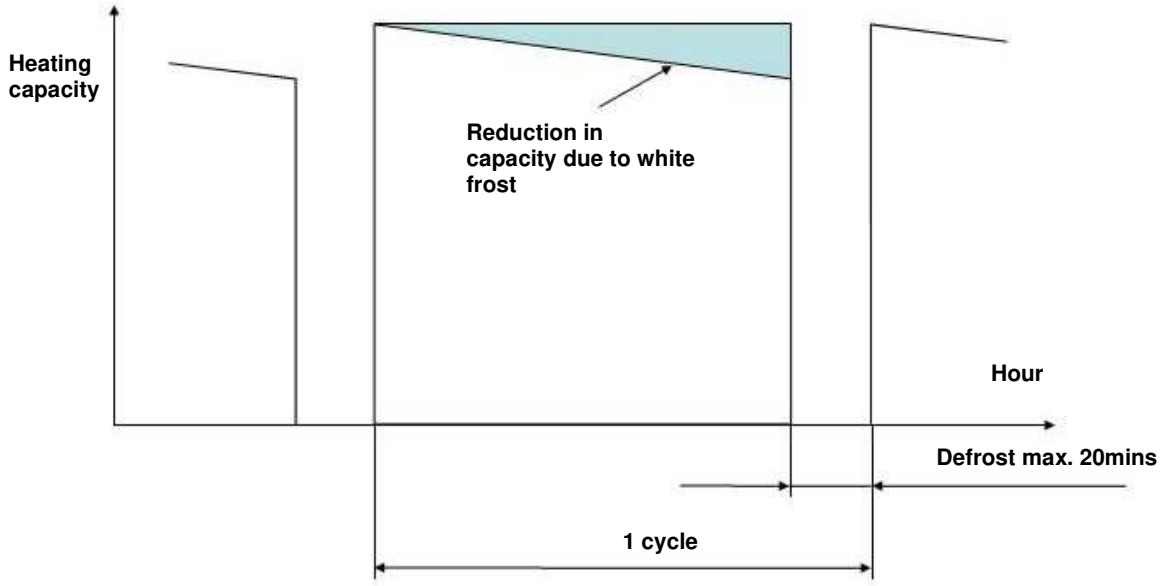
3.3. CORRECTION FACTORS ACCORDING TO DEFROSTING OPERATION

The heating capacity in the preceding paragraph, excludes the condition of the frost or the defrosting operation period. In consideration of the frost or the defrosting operation, the heating capacity is corrected by the equation below.

Corrected heating capacity = Defrost Correction factor x unit capacity

OUTDOOR TEMPERATURE (°FDB)	5	14	19.4	23	32	44.6	50	59
Correction factor (humidity rate85% RH)	0.95	0.95	0.89	0.85	0.81	1.0	1.0	1.0

Correction Factor

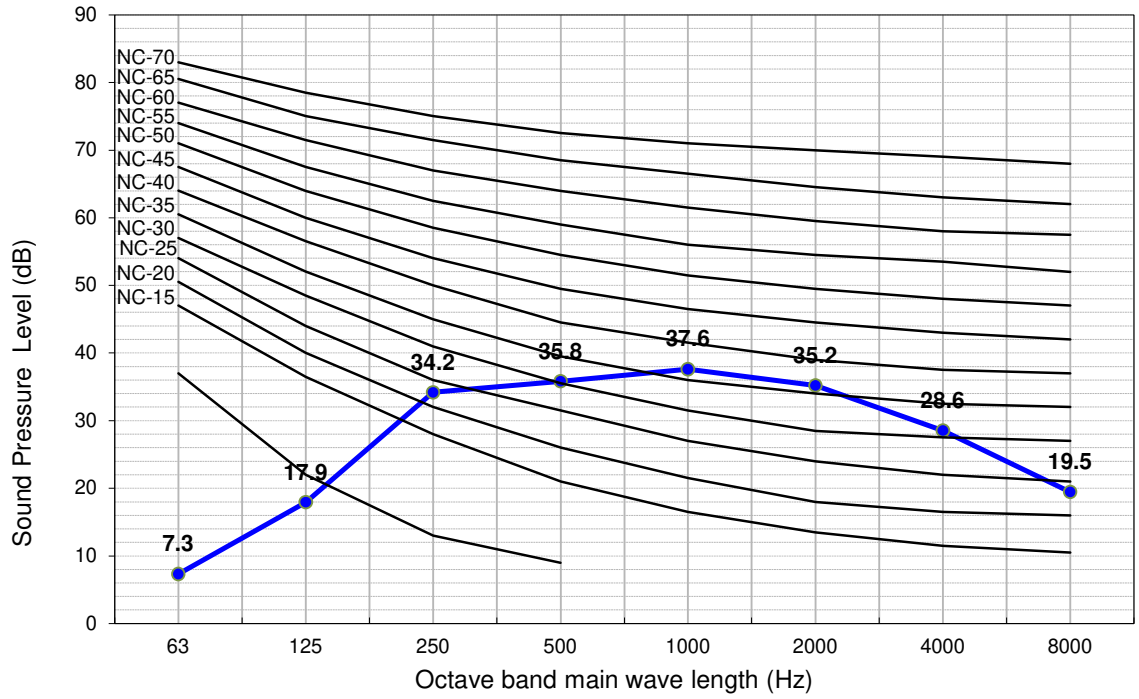


NOTE:
The correction factor is not valid for special conditions such as snowfall or operation in a transitional period.

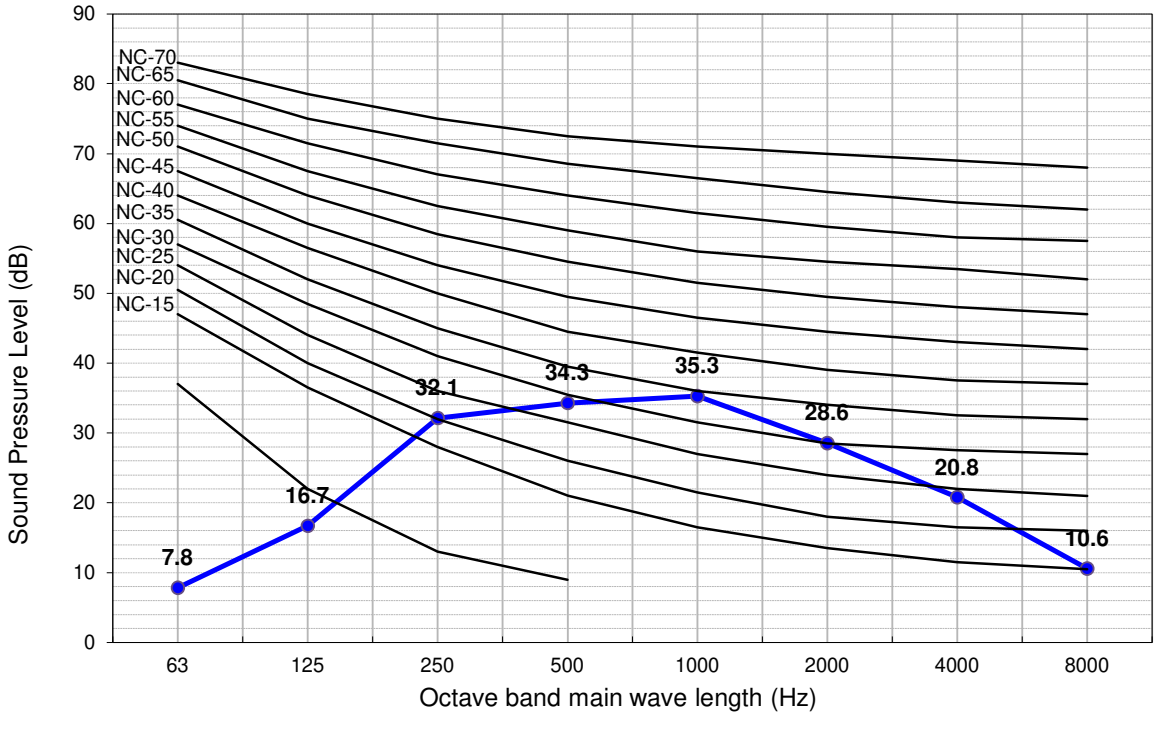
4 SOUND DATA

4.1. RAS-SH09RHLAE

COOLING

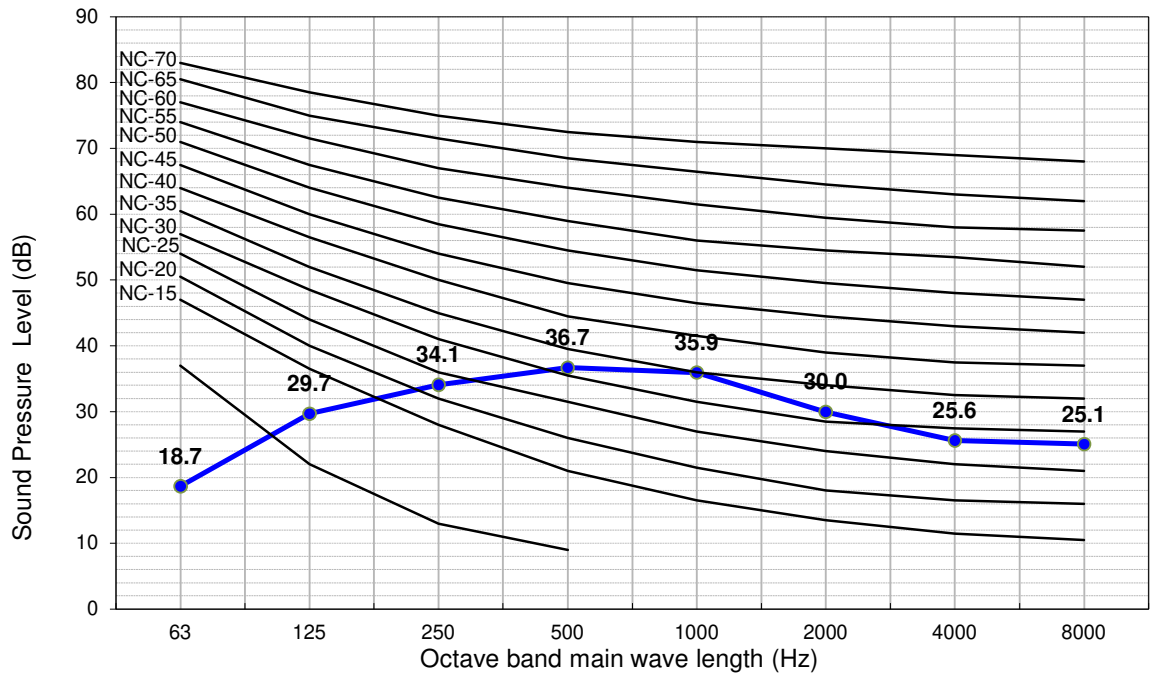


HEATING

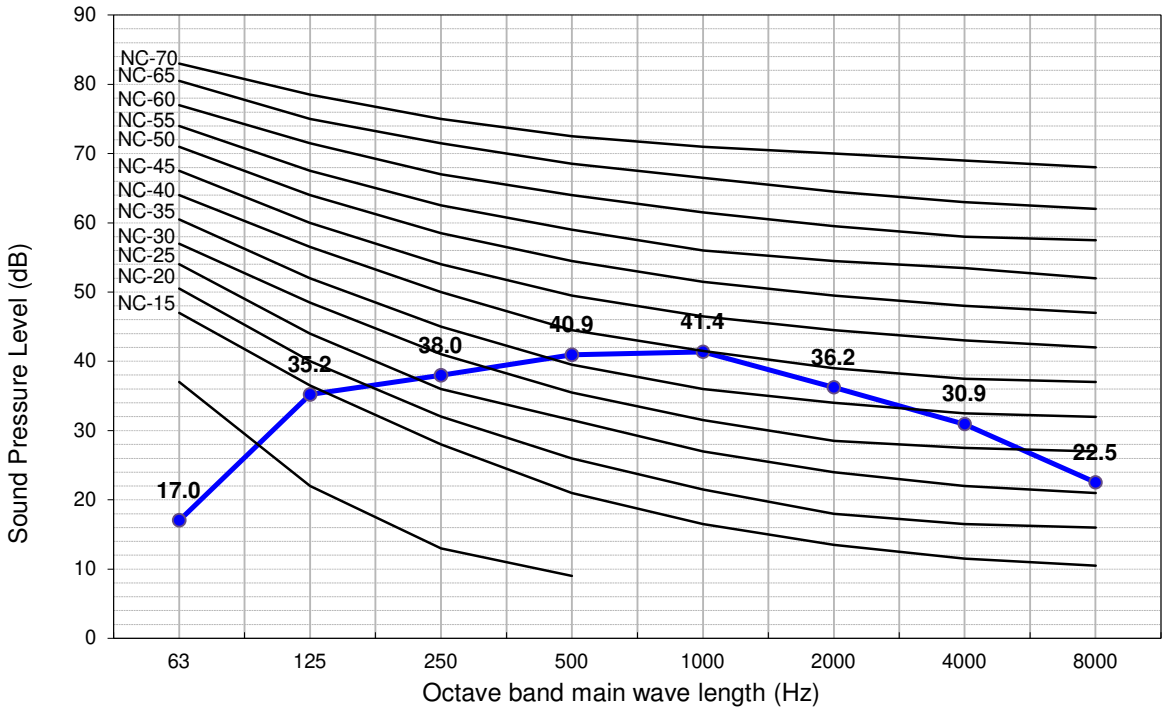


4.2. RAC-SH09WHLAE

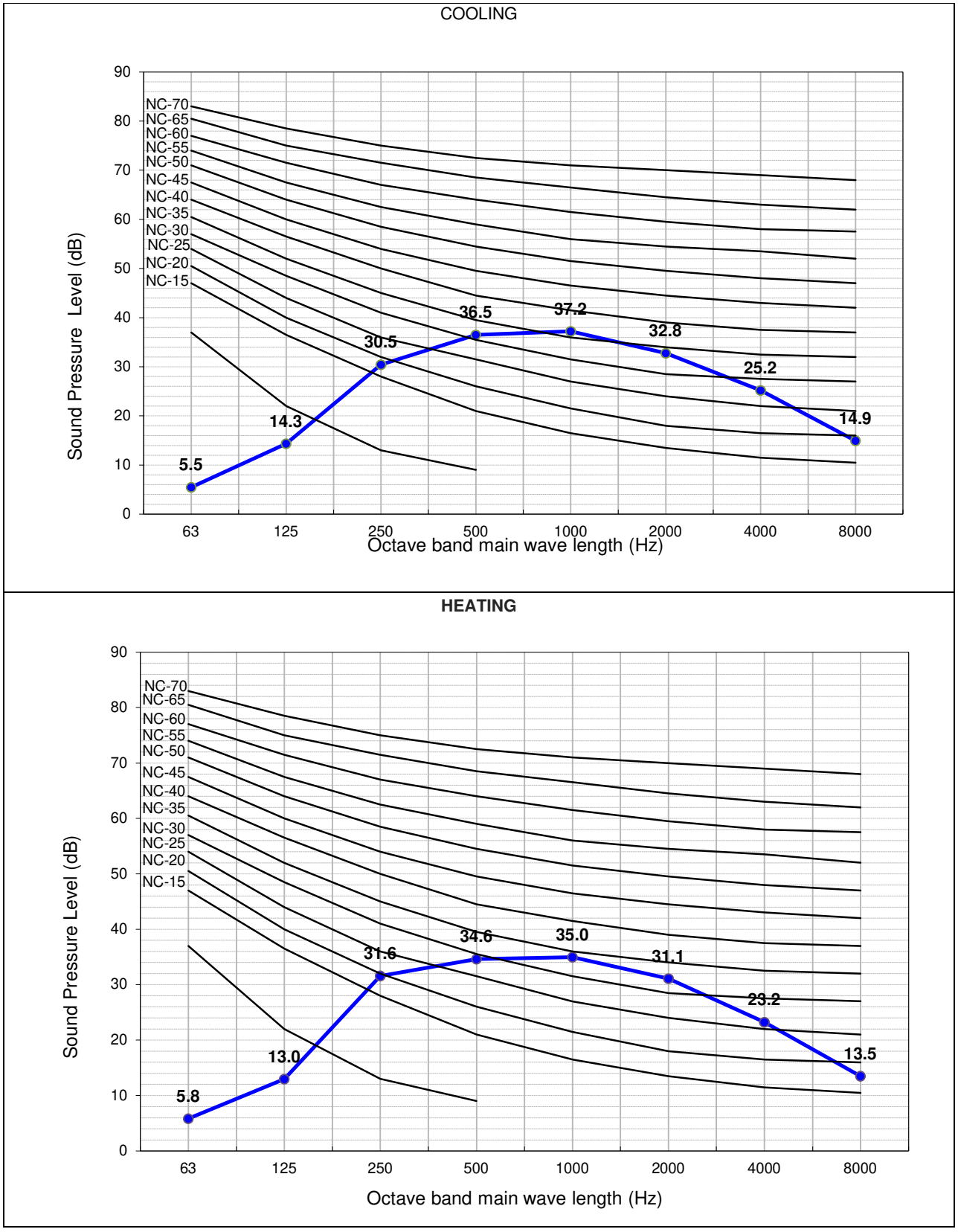
COOLING



HEATING

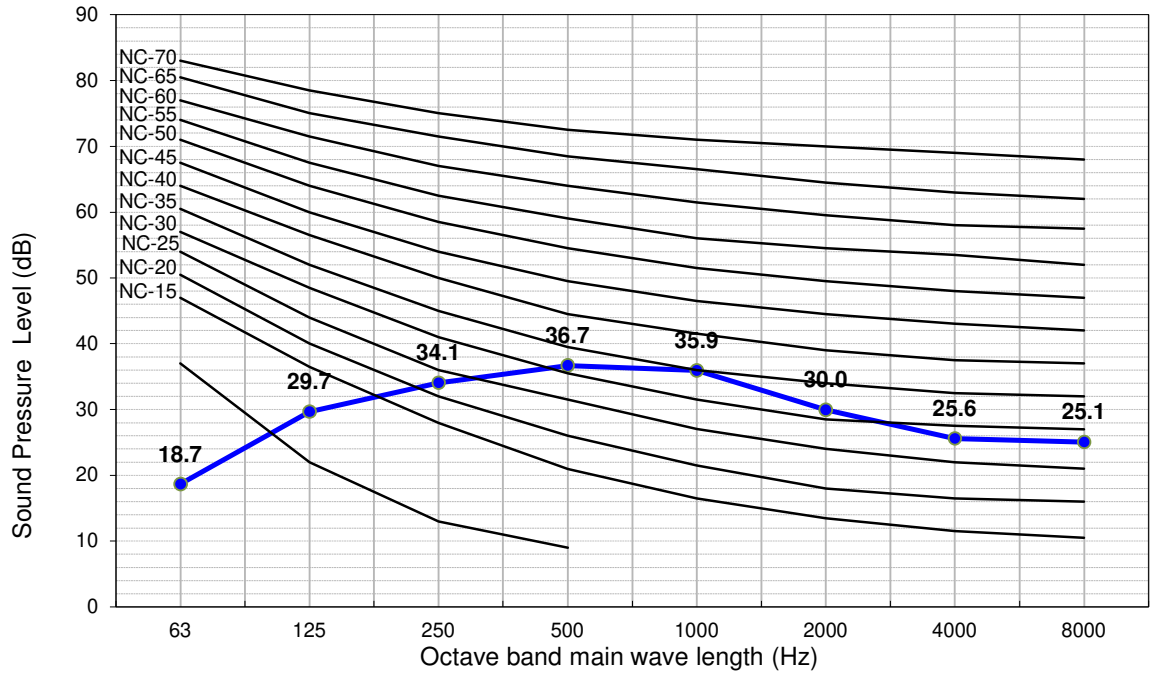


4.3. RAS-SH12RHLAE

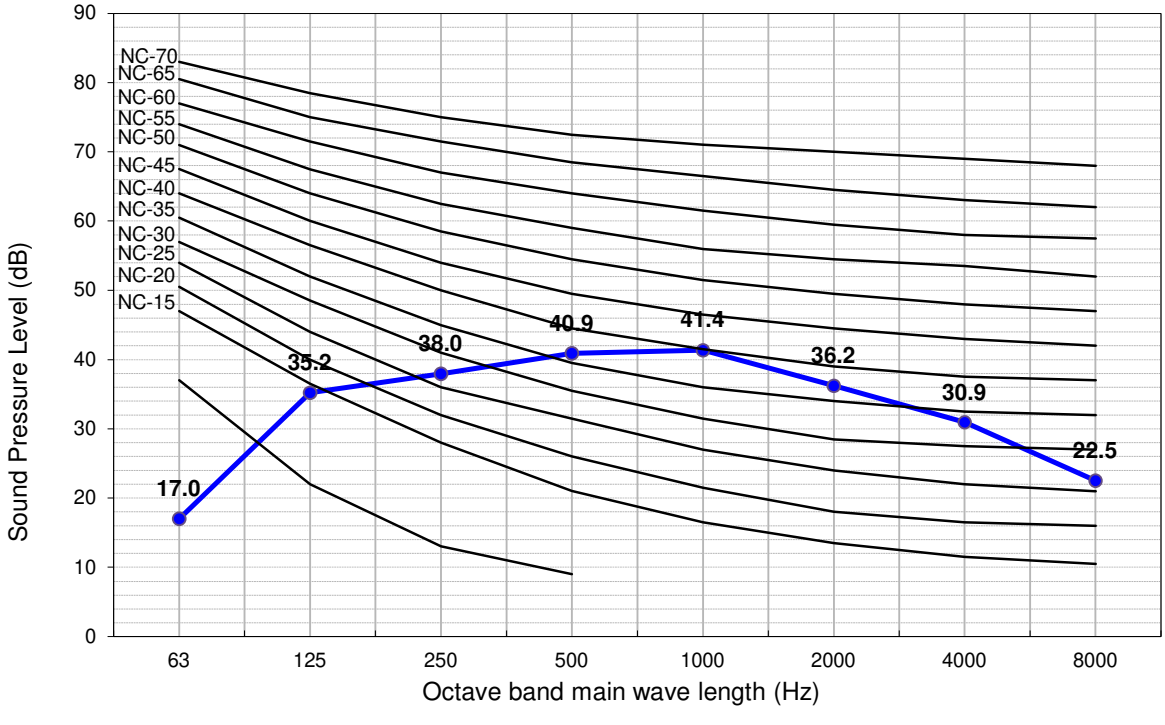


4.4. RAC-SH12WHLAE

COOLING

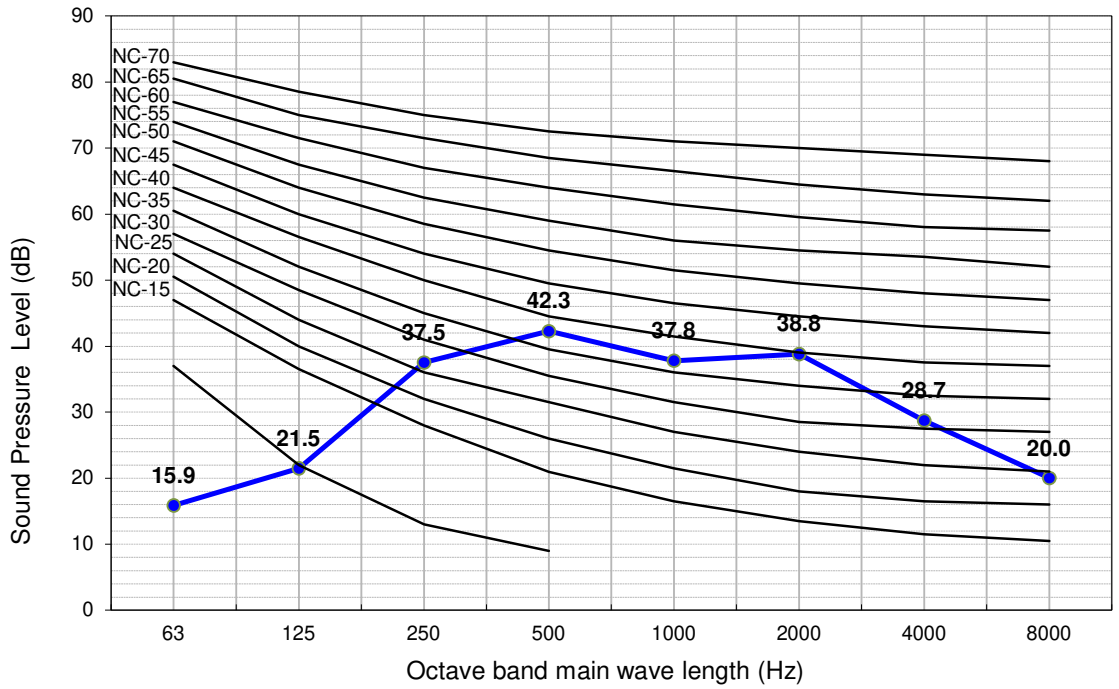


HEATING

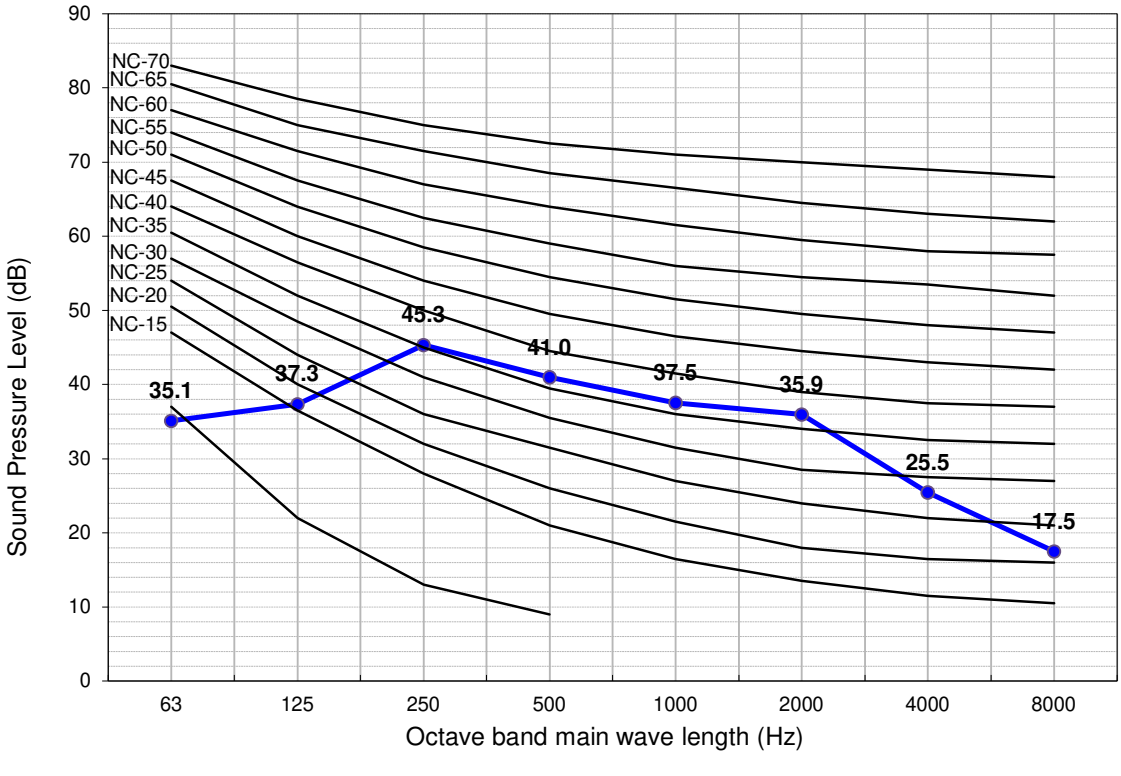


4.5. RAS-SH18RHLAE

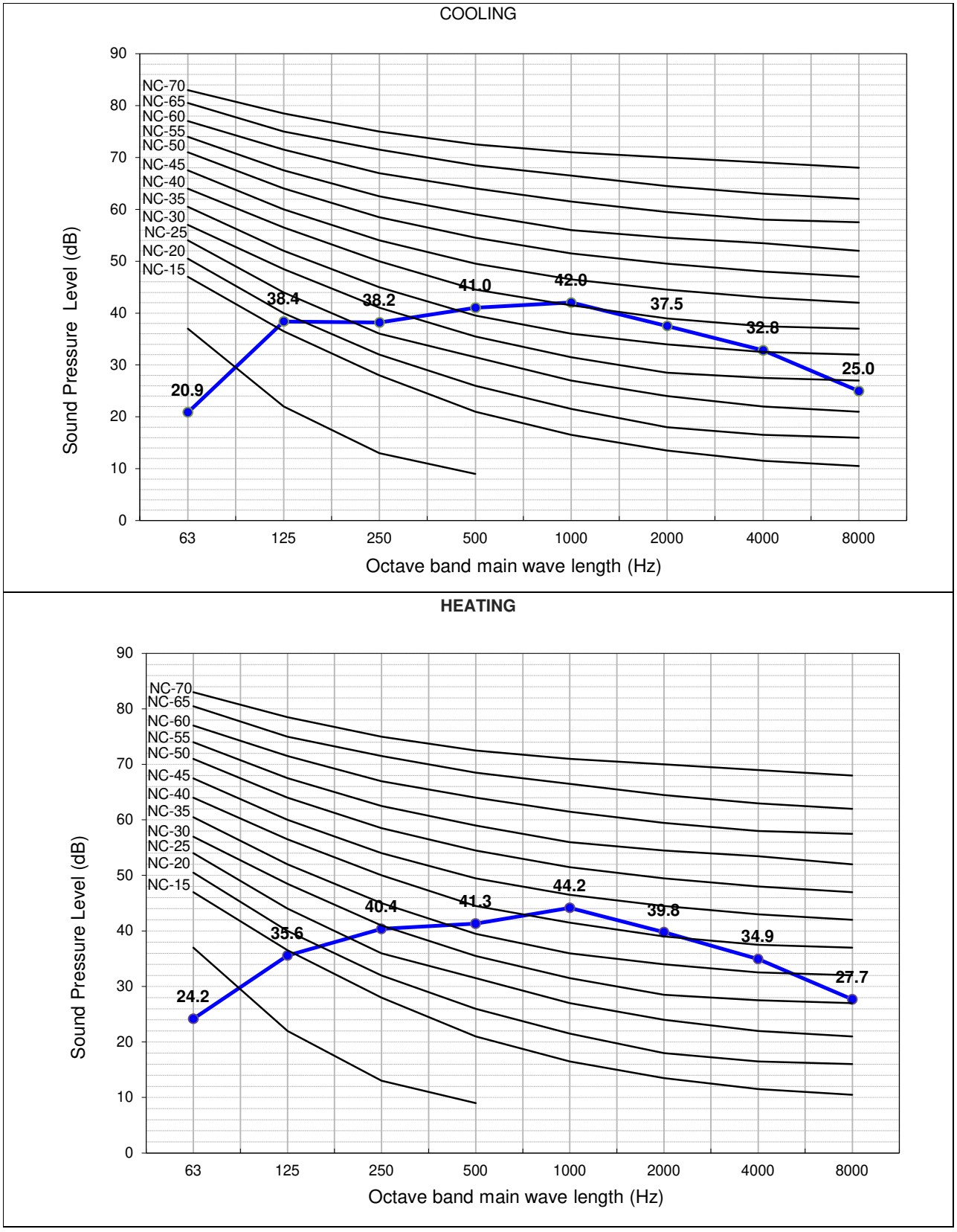
COOLING



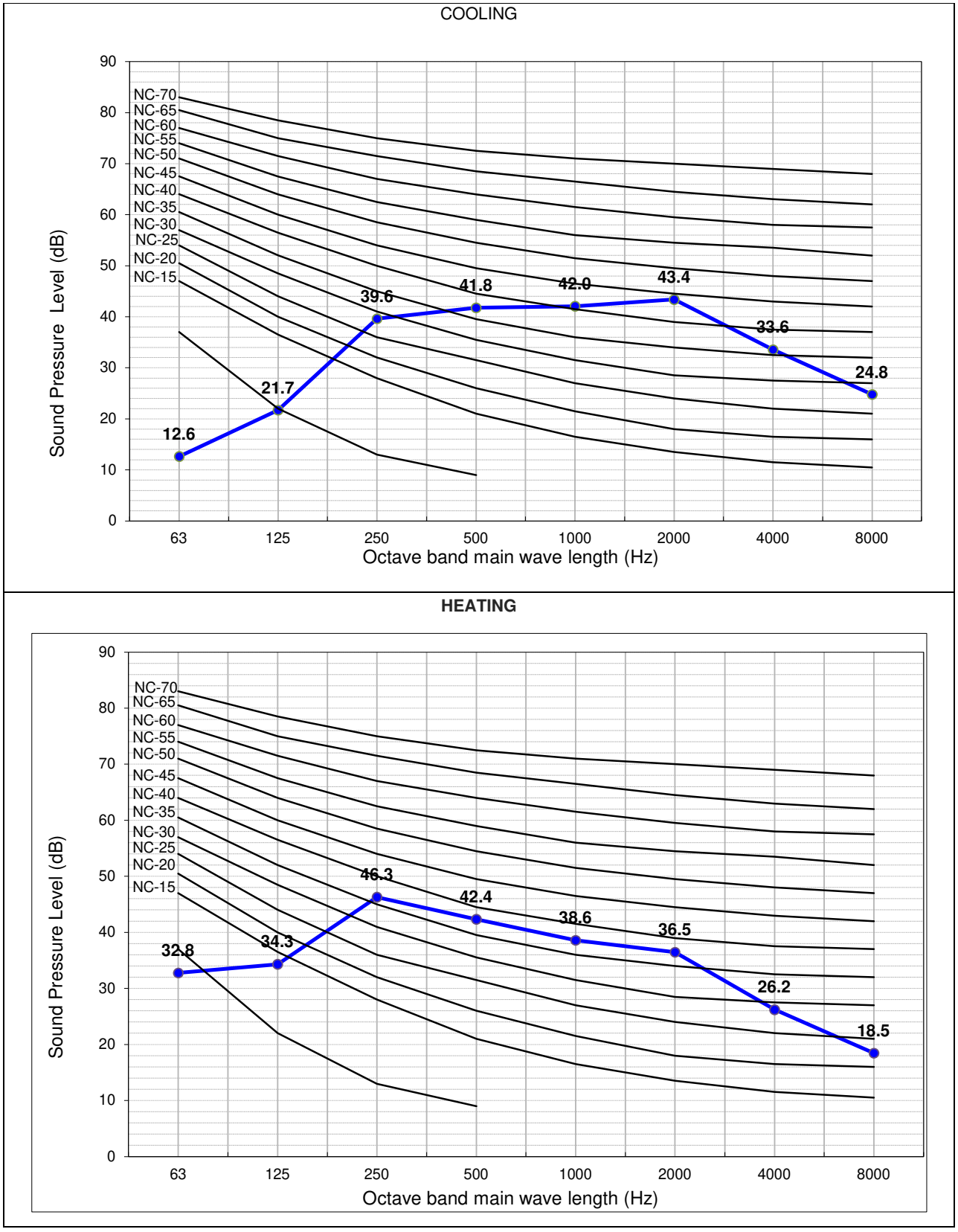
HEATING



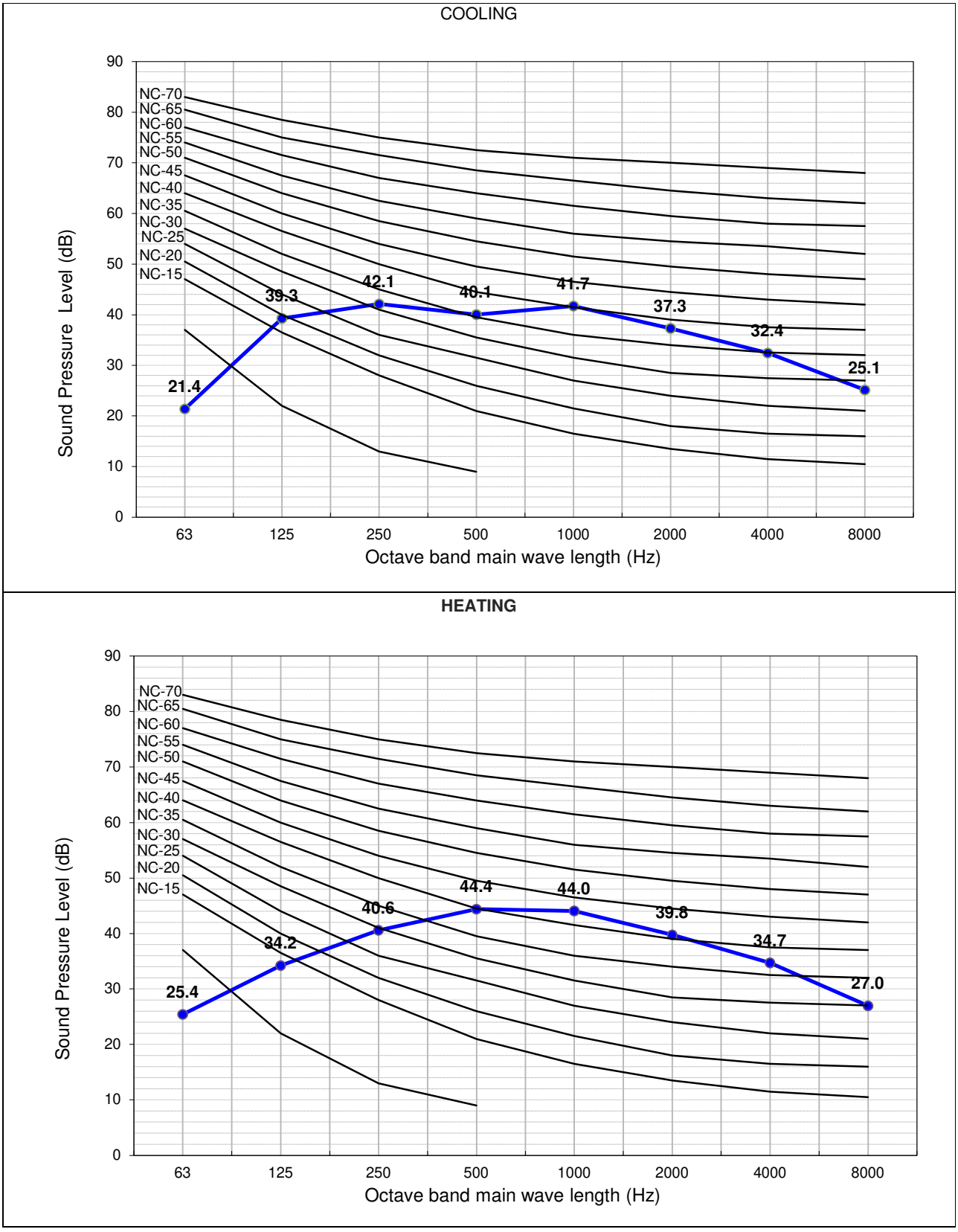
4.6. RAC-SH18WHLAE



4.7. RAS-SH24RHLAE



4.8. RAC-SH24WHLAE



5 WORKING RANGE

5.1. POWER SUPPLY

Working Voltage	187V ~ 253V
Voltage Imbalance	Within a 3% Deviation from Each Voltage at the Main Terminal of Outdoor Unit
Starting Voltage	Higher than 85% of the Rated Voltage

5.2. WORKING RANGE

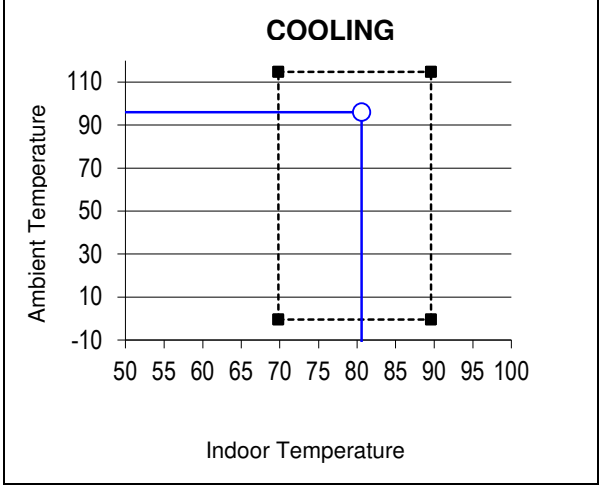
Applicable models:

RAC-SH09WHLAE
RAC-SH12WHLAE
RAC-SH18WHLAE
RAC-SH24WHLAE

The temperature range is indicated in the following table.

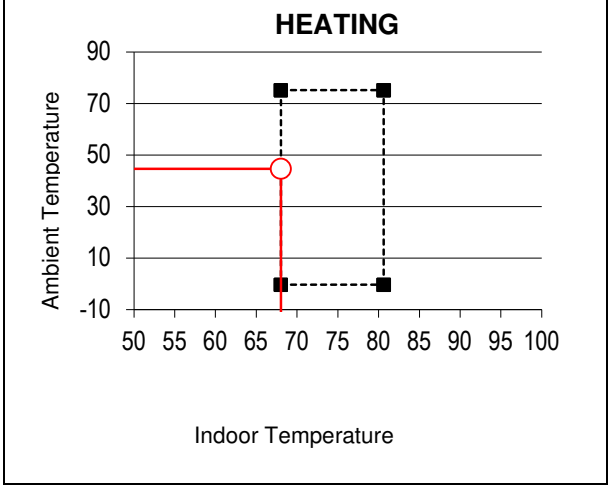
Cooling

working range	min (º F)	max (º F)	rated (º F)
outdoor	-0.4	114.8	96
indoor	69.8	89.6	80.6



Heating

working range	min (º F)	max (º F)	rated (º F)
outdoor	-0.4	75.2	44.6
indoor	68	80.6	68



6 ELECTRICAL DATA

6.1. INDOOR UNIT

Model	Unit Main Power	Rated input current of power conversion equipment (A)	Indoor Fan Motor	
	VOL, PH, Hz		RNC	IPT
RAS-SH09RHLAE	208-230, 1, 60	0.62	0.67	30
RAS-SH12RHLAE	208-230, 1, 60	0.62	0.67	30
RAS-SH18RHLAE	208-230, 1, 60	0.64	0.16	45
RAS-SH24RHLAE	208-230, 1, 60	0.64	0.16	45

VOL: Rated Unit Power Supply Voltage (V)
Hz: Frequency (Hz)
IPT: Input (W)
RNC: Running Current (A)
PH: Phase (ϕ)

6.2. OUTDOOR UNIT

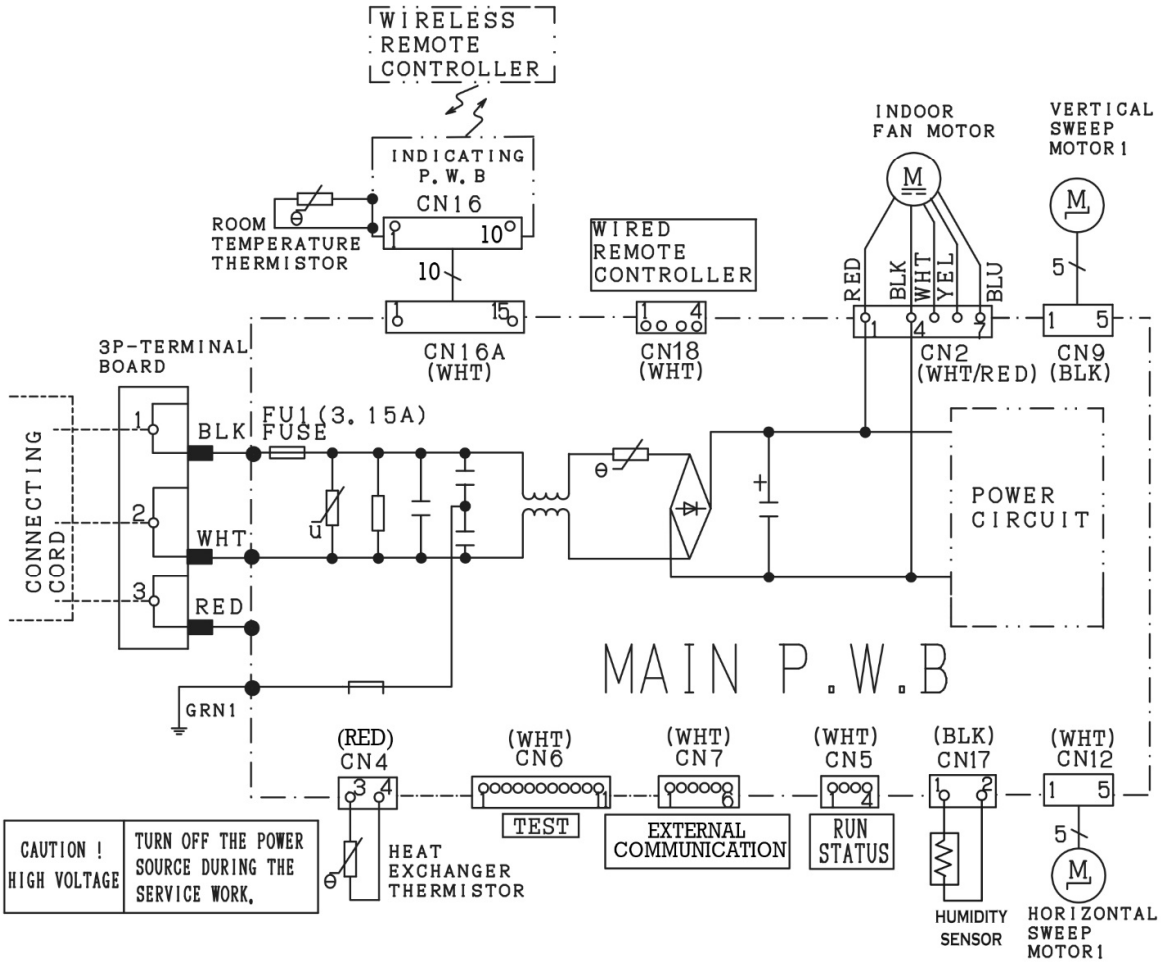
Model	Unit Main Power		Electrical Data			
	VOL, PH, Hz	Rated input current of power conversion equipment (A)	Rated Cooling Current (A)	Rated Heating Current (A)	MCA	MOP
RAC-SH09WHLAE	208-230, 1, 60	8.19	2.9	3.8	12	15
RAC-SH12WHLAE	208-230, 1, 60	8.19	4.2	5	12	15
RAC-SH18WHLAE	208-230, 1, 60	12.0	5.9	7	17	20
RAC-SH24WHLAE	208-230, 1, 60	15.0	7.4	8.5	20	20

VOL: Rated Unit Power Supply Voltage (V)
HZ: Frequency (Hz)
MCA: Minimum Circuit Ampacity (A)
PH: Phase (ϕ)
MOP: Maximum Overcurrent Protection (A)

7 WIRING DIAGRAM

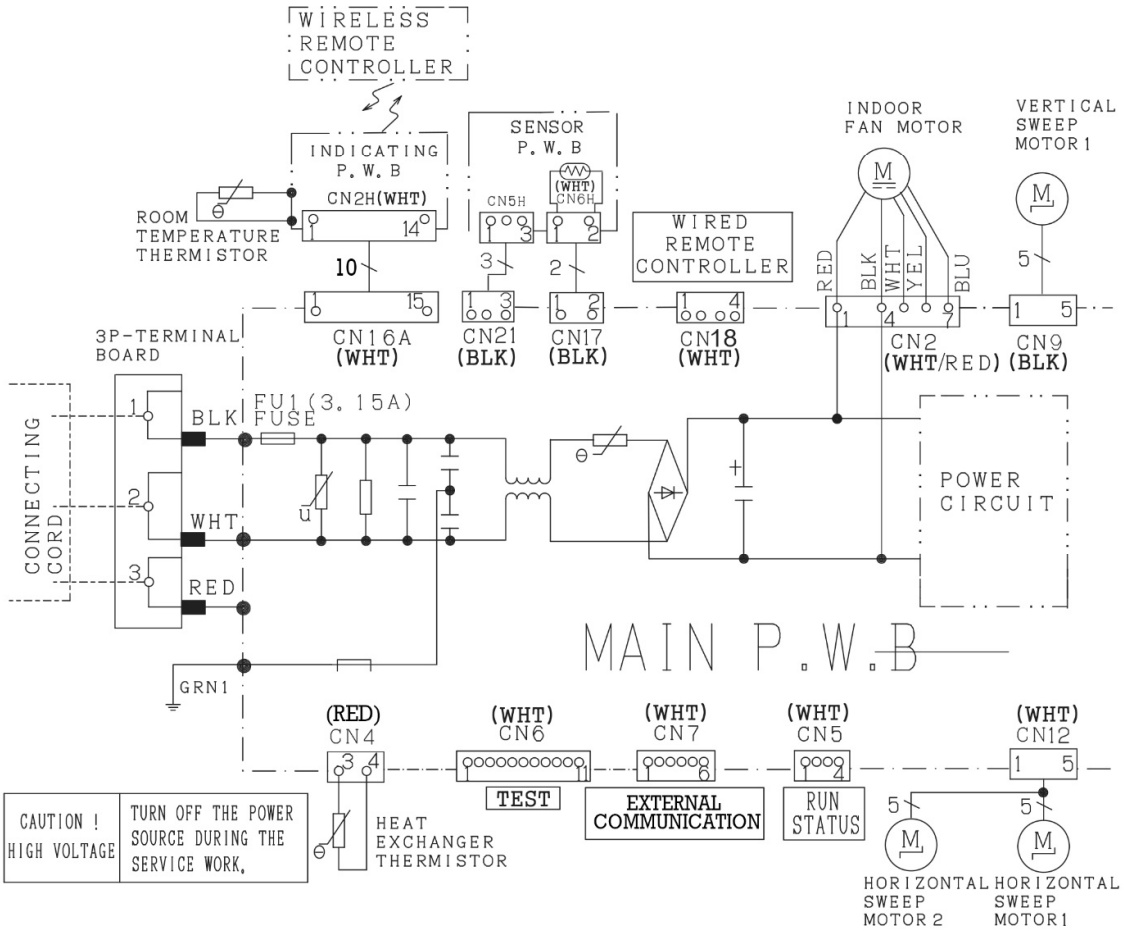
7.1. RAS-SH09RHLAE RAS-SH12RHLAE

BLU	: BLUE	YEL	: YELLOW	BRN	: BROWN	WHT	: WHITE
GRY	: GRAY	ORN	: ORANGE	GRN	: GREEN	RED	: RED
BLK	: BLACK	PNK	: PINK	VIO	: VIOLET	IVO	: IVORY

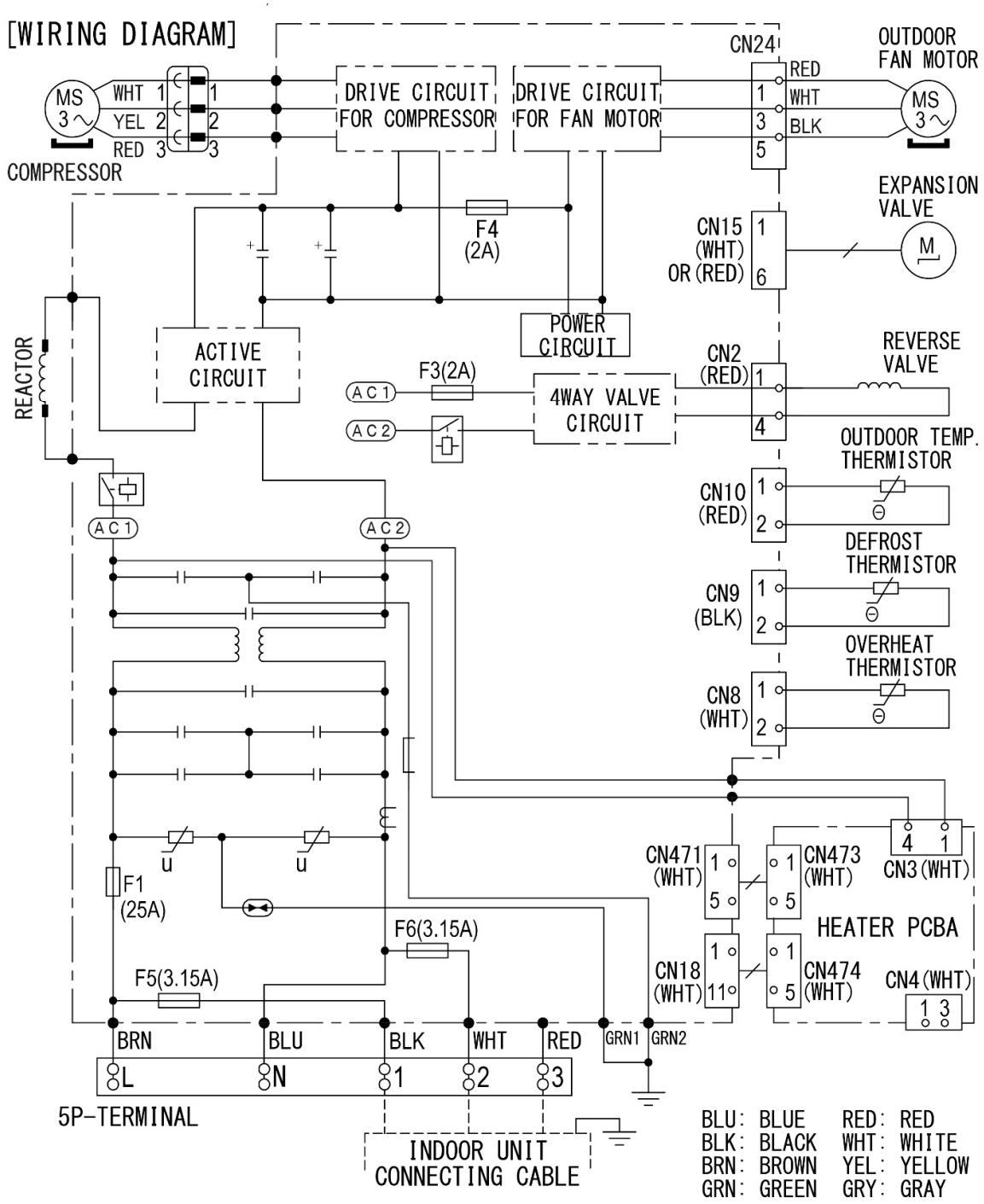


7.2. RAS-SH18RHLAE, RAS-SH24RHLAE

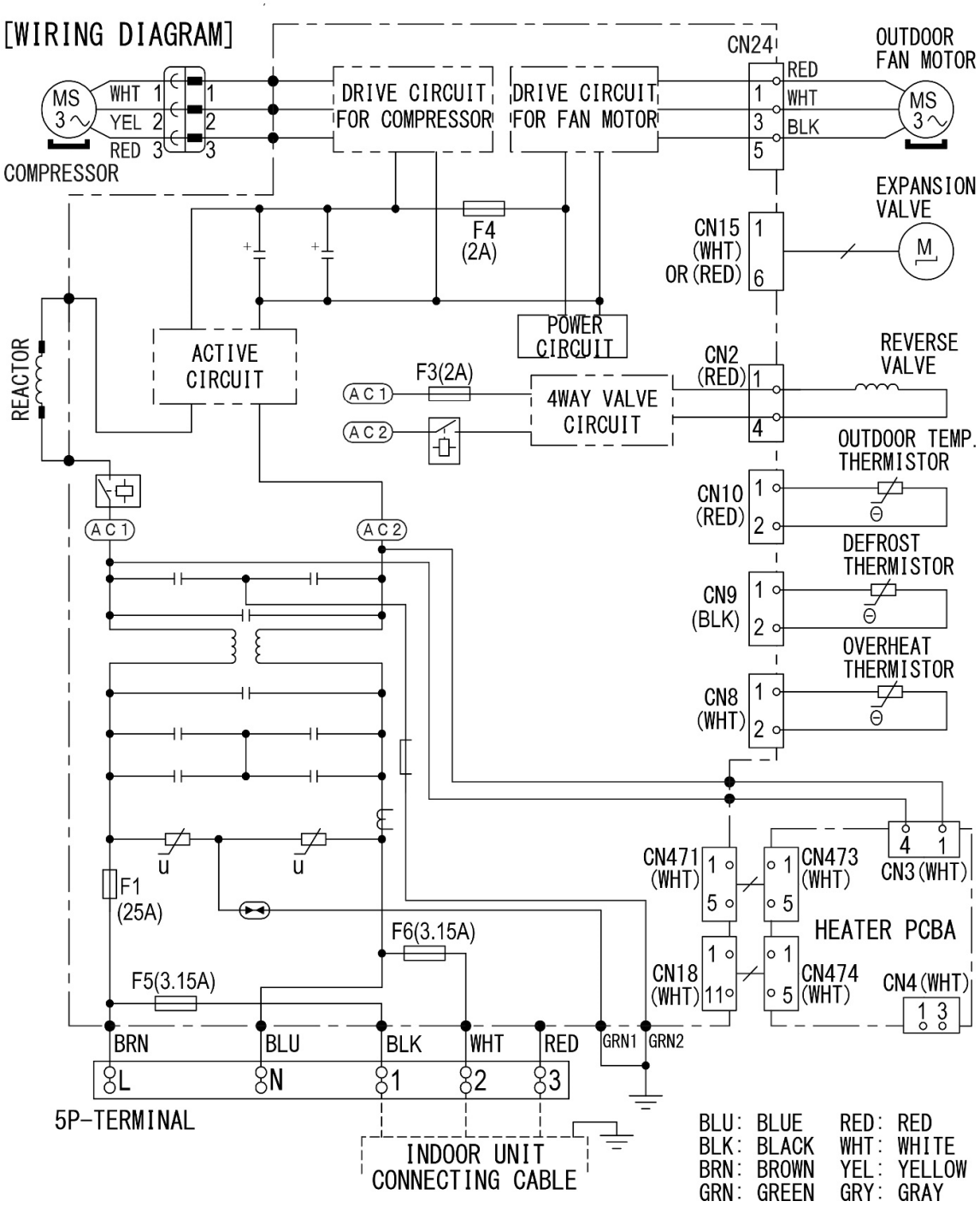
BLU	: BLUE	YEL	: YELLOW	BRN	: BROWN	WHT	: WHITE
GRY	: GRAY	ORN	: ORANGE	GRN	: GREEN	RED	: RED
BLK	: BLACK	PNK	: PINK	VIO	: VIOLET	IVO	: IVORY



7.3. RAC-SH09WHLAE, RAC-SH12WHLAE

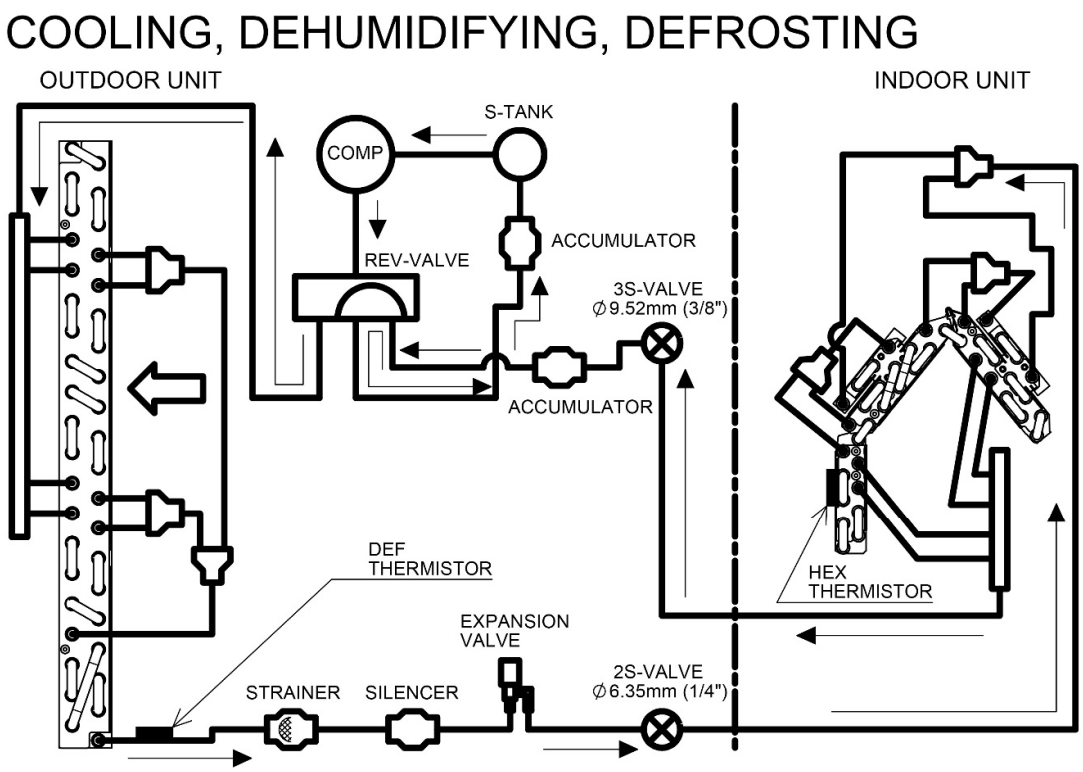


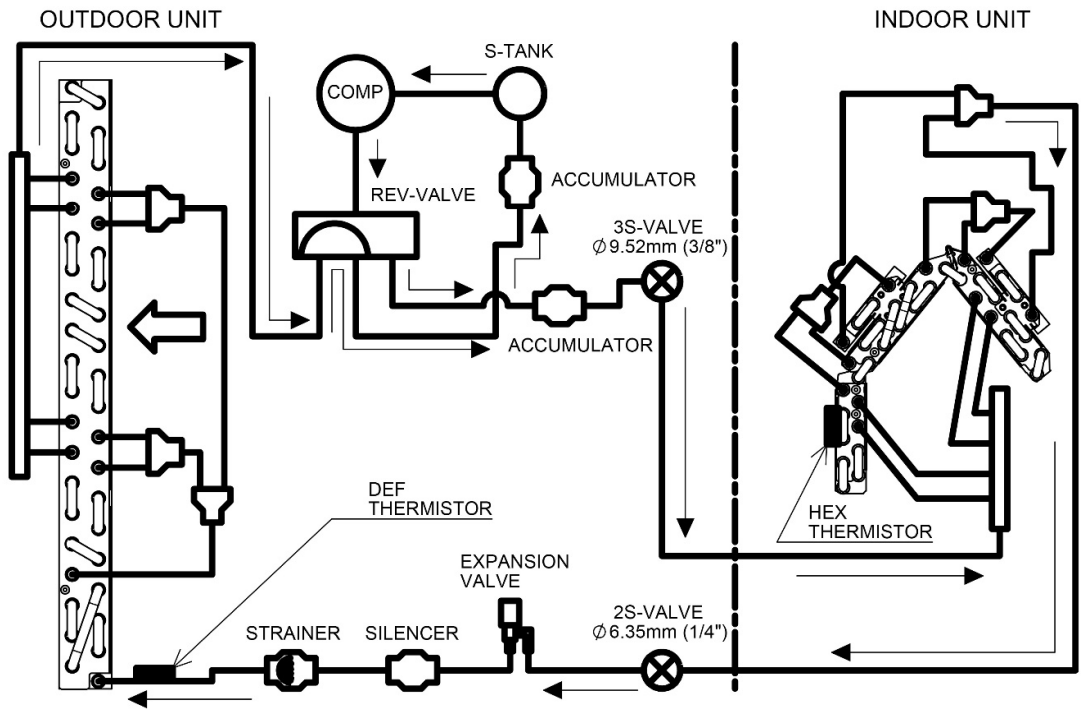
7.4. RAC-SH18WHLAE, RAC-SH24WHLAE



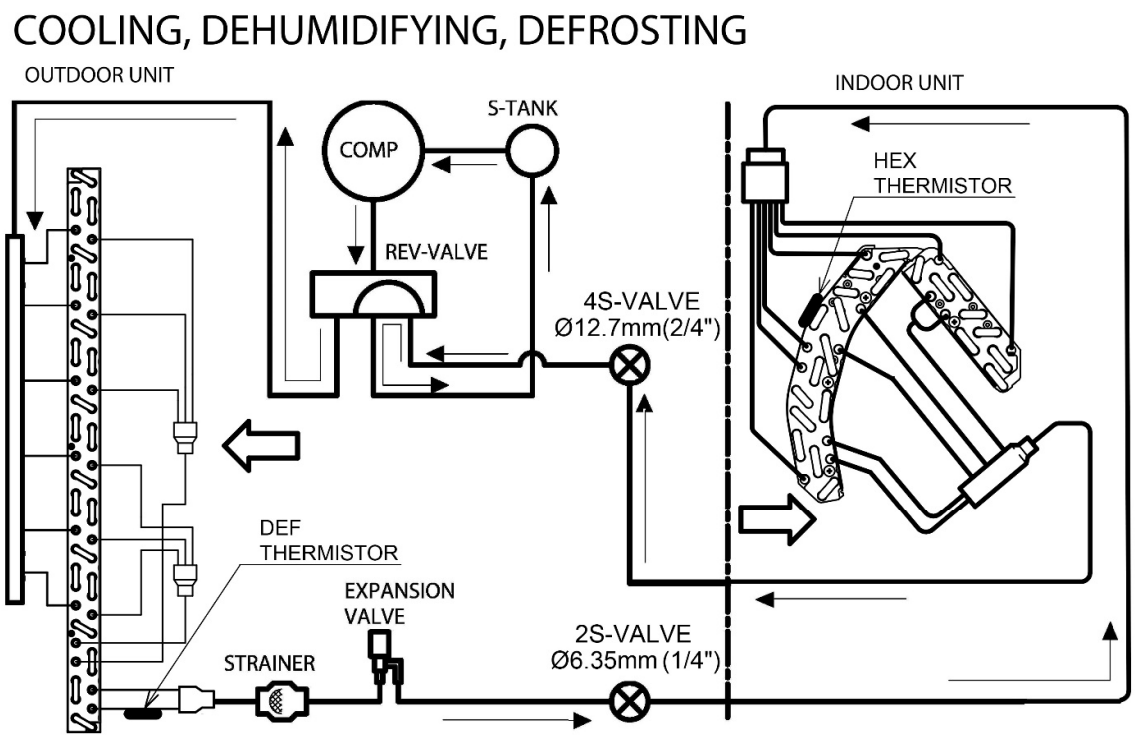
8 REFRIGERANT CYCLE

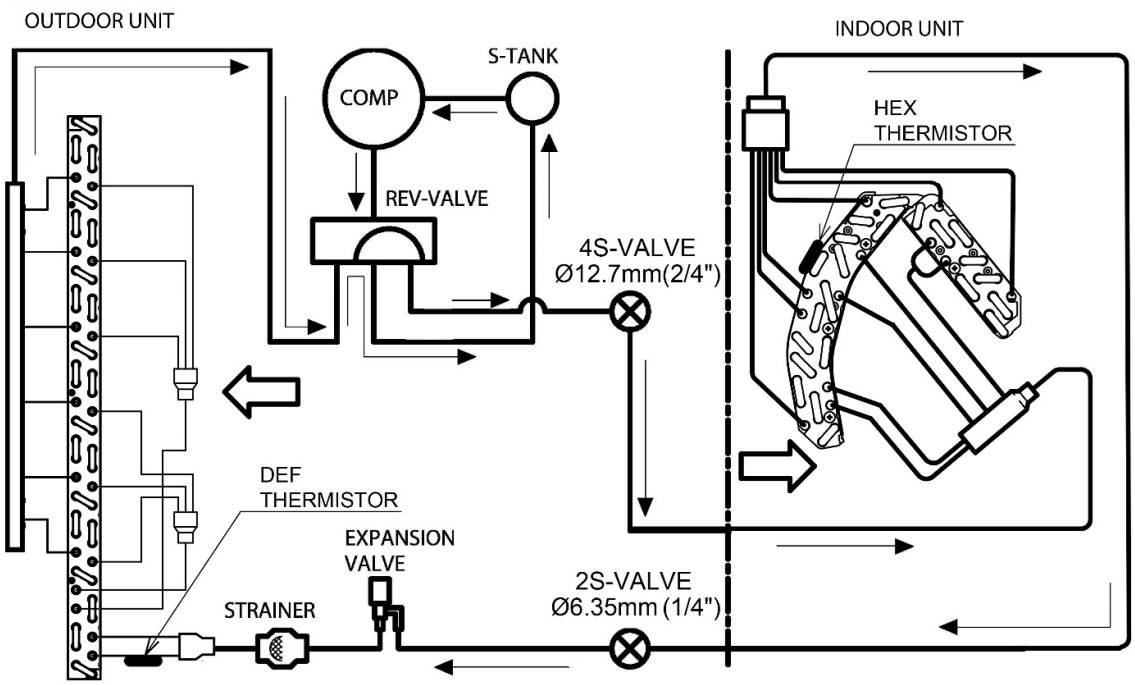
8.1. RAS-SH09RHLAE/RAC-SH09WHLAE, RAS-SH12RHLAE/RAC-SH12WHLAE



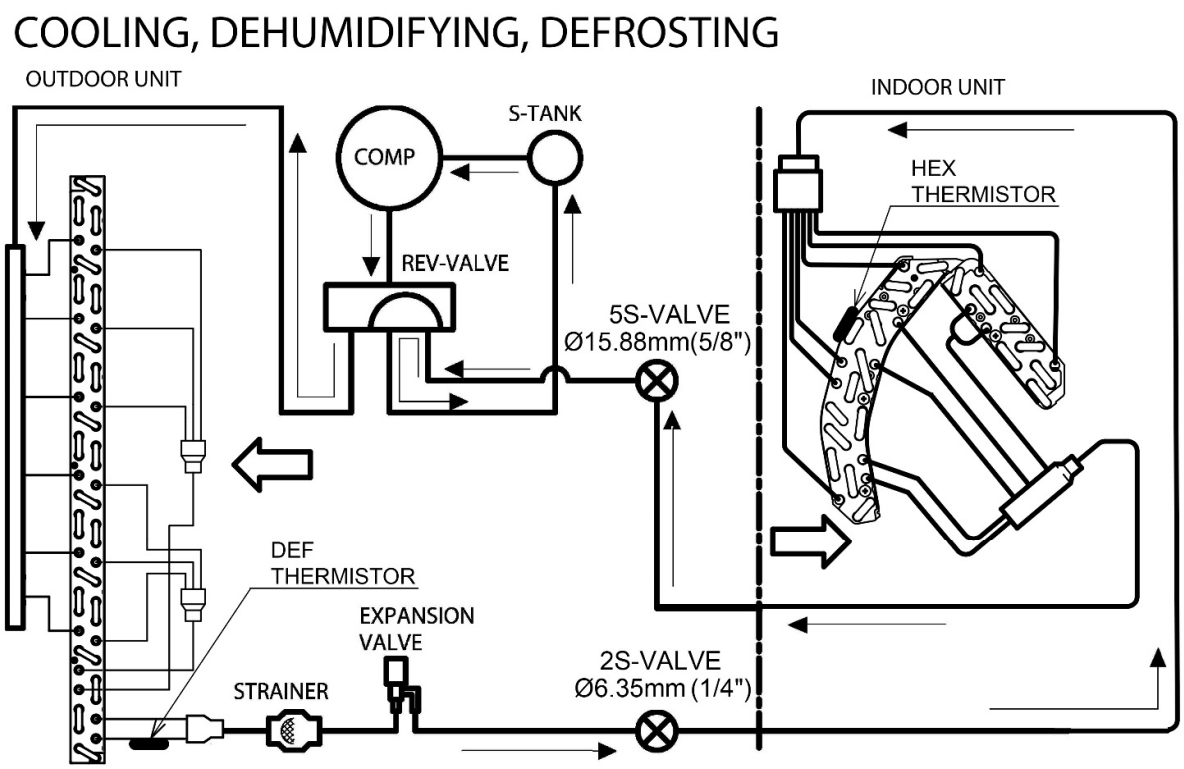


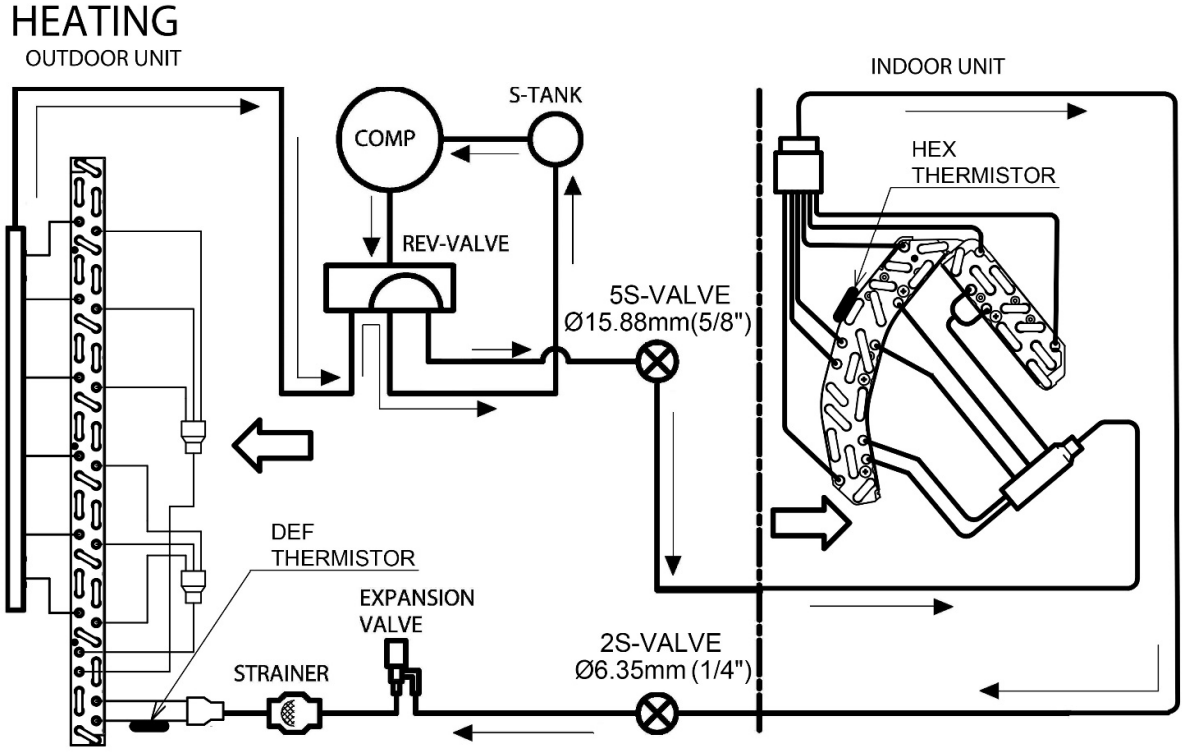
8.2. RAS-SH18RHLAE/RAC-SH18WHLAE





8.3. RAS-SH24RHLAE/RAC-SH24WHLAE





9 CONTROL FUNCTION

9.1. WIRELESS REMOTE CONTROL FUNCTION

REMOTE CONTROLLER TYPE

RAR-M0B6

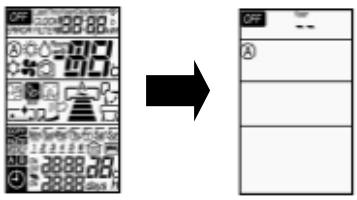
RAS-SH09RHLAE RAS-SH12RHLAE RAS-SH18RHLAE RAS-SH24RHLAE

BUTTONS	FUNCTION
MODE	**MODE Selector** Use this button to select the operationg mode. Every time you press this button, the mode will change from (AUTO) → (HEAT) → (DEHUMIDIFY) → (COOL) and → (FAN) cyclically.
FAN	**FAN SPEED Selector Button** This determines the fan speed. Every time you press this button, the airflow rate will change from (AUTO) → (HIGH) → (MED) → (LOW) → (SILENT) (This button allows selection of optimal or preferred fan speed for each operation mode).
	START/STOP button Press this button to start operation. Press it again to stop operation.
ECO	**ECO button** Use this button to set the ECO mode.
	POWERFUL button Use this button to set the POWERFUL mode.
	SILENT button Use this button to set the SILENT mode.
	INFO button 1) Press this button to display temperature for 10 seconds. 2) Press this button to check monthly power consumption. 3) Press this button to recieve the current calendar and clock.
	ECO SLEEP TIMER button Use this button to set the ECO sleep timer.
	AUTO SWING (Vertical) button Controls the angle of the horizontal air deflector.
	AUTO SWING (Horizontal) button Controls the angle of the vertical air deflector.

LH	**LEAVE HOME button** Prevent the room temperature from falling too much by setting temperature 50°F~60°F when no one is at home.
	FROST WASH / CLEAN button The dust and dirt adhering to indoor heat exchanger which is the cause of the smell. They are washed away by freezing and thawing of the heat exchanger.
WEEKLY TIMER buttons	
OFF TIMER ON	**ON/OFF TIMER button** The device will turn on (off) and off (on) at the designated time.
TIME	**TIME button** Press the button to set starting time of the program
OK	**OK button** Press the button to save the program. The button shall be pressed everytime after finishing a program setting.
DELETE	**DELETE button** 1) Press the button to delete the selected program. 2) Press the button for about 10 seconds by directing the remote controller towards the indoor unit while Mode A or B display blinks, programs for Mode A or B will be deleted both from the indoor unit and the remote controller after the beep sound from the indoor unit.
Mon-Sun	**DAY button** Select the desired day of the week.
1 – 6	**PROGRAM NO. button** Press this button to select a program number.
CANCEL	**CANCEL** 1) Press the button to cancel the current setting process on the screen. 2) Press the button by directing the remote controller towards the indoor unit, hen weekly timer setting will be canceled from indoor unit after the beep sound from the indoor unit. The program setting remains in the remote controller.
SEND	**SEND button** Press the button for about 3 seconds by directing the remote controller towards the indoor unit after finishing the program setting. Timer lamp on the indoor unit will blink rapidly and after the beep soung from indoor unit, TIMER lamp will light up.
CLOCK	**CLOCK button** Press the button to set calendar and clock.
WEEKLY A/B	**WEEKLY TIMER MODE button** 1) Select Mode A or Mode B. 2 modes can be set and stored as a weekly timer. 2) By pressing the button longer than 3 seconds, program setting screen will appear.

9.1.1. SHIFT VALUE

1. Press and hold ⏻ (START/STOP) button and TIMER ON (ON) button.
2. Press RESET [RESET] button on the same time. Release RESET [RESET] button only, then release ⏻ (START/STOP) and TIMER ON (ON) button once Screen 1 appears.



Screen 1 Screen 2

3. Press the MODE (MODE) button to display fan mode (Screen 3).

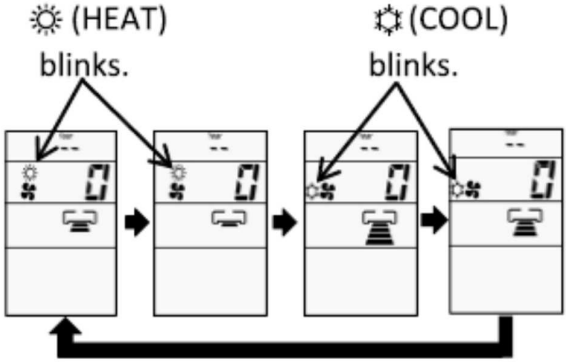
Screen 3

4. Press ⏻(START/STOP) and Screen 4 appear.

Screen 4

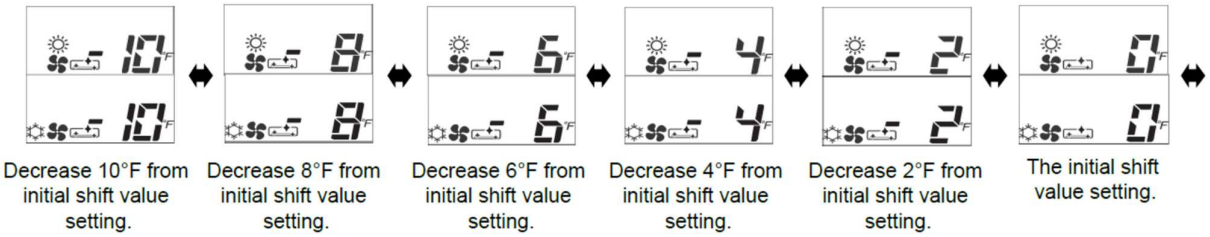
5. Select FAN (FAN SPEED) button to choose Heating Shift or Cooling Shift Mode (Screen 5).

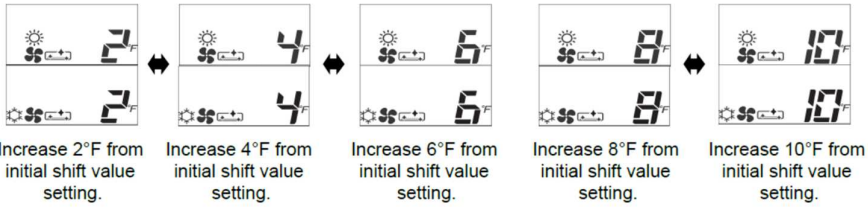
By setting fan speed to HIGH or MED , it will go to Cooling Shift mode.
By setting fan speed to LOW or SILENT , it will go to Heating Shift mode.



Screen 5

6. Press the Temperature button (or) to adjust the shift value.





NOTE:
1. There are total of 11 shift values ranging from -10 to 10.
2. The displayed shift value, (HEAT) and (COOL) symbol on the remote controller display will disappear after 10 seconds
3. The changed shift value will remain unchanged after turned off the power.
4. If “0” is displayed on the remote controller display, it indicates the shift value is now at the initial setting.

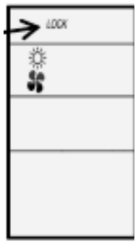
9.1.2. OPERATION LOCK

1. HEATING MODE

a) Press and hold ECO (ECO) and POWERFUL (POWERFUL) buttons, press RESET (RESET) button on the same time. Release RESET (RESET) button only when Screen 1 appear, then release ECO (ECO) button and POWERFUL (POWERFUL) button.

Screen 1

b) Wait until only Screen 2 appear.



Screen 2

c) The heating mode operation is locked.

d) To unlock HEATING mode, repeat step (a). After all operations mode symbols displayed for 10 seconds, the operation mode symbol before cancellation will be display. The heating mode operation is unlocked.

2. COOLING AND DEHUMIDIFYING MODE

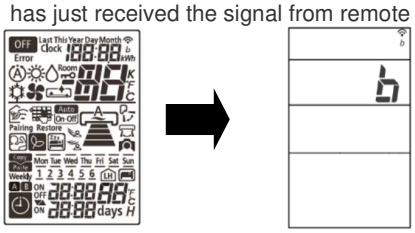
a) Press and hold ECO (ECO) and SILENT (SILENT) buttons for at least 5 seconds when the remote controller is OFF.

b) Wait until only and displayed on the screen. The cooling and dehumidifying modes operation is locked.

c) To unlock HEATING mode, repeat step (a). After all operations mode symbols displayed for 10 seconds, the operation mode symbol before cancellation will be display. The cooling and dehumidifying mode operation is unlocked.

9.1.3. SETTING THE PREVENTION OF MUTUAL INTERFERENCE

1. Please ensure the other indoor unit is OFF.
2. Press 1-6 (PROGRAM NO.) button, TIMER ON (ON TIMER) button and RESET (RESET) button simultaneously. The remote controller will display Screen 1 and followed by Screen 2. The indoor unit beeps to indicate that it has just received the signal from remote controller.



Screen 1 Screen 2

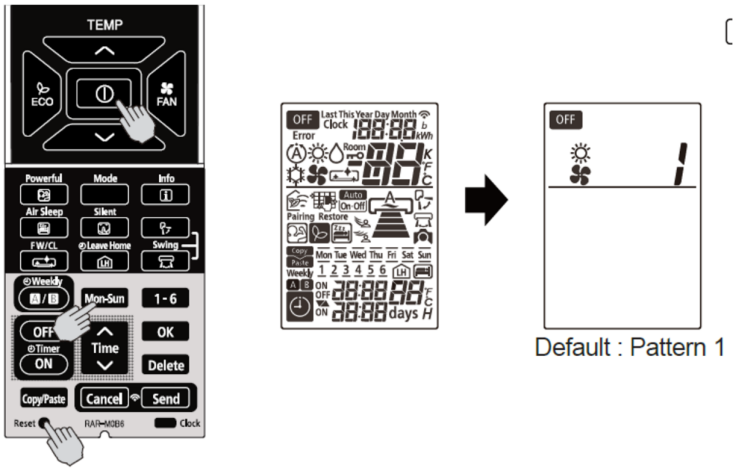
NOTE:
If indoor unit still not receive the correct signal from the correct remote controller, setting shall be made again. By setting again for the 2nd time, the signal address will change from B to A, then repeat again for the 3rd time.

9.1.4. INTERMITTENT FAN SPEED SETTING

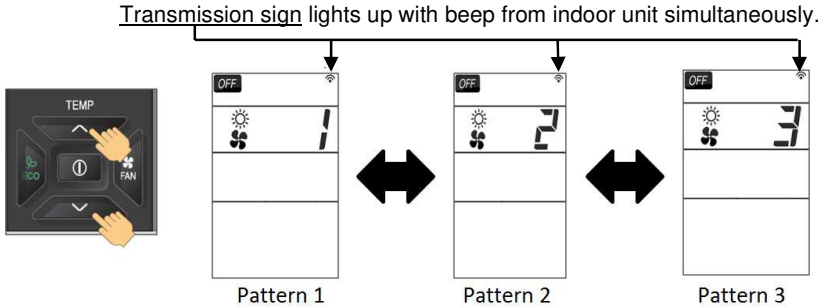
The intermittent fan control during thermo off in Heating Mode can be changed by the remote controller.
(This procedure should be done only by service personnel.)
It is possible to select from 3 patterns.

PROCEDURE

1. Press ① [START/STOP] button, Mon-Sun [Mon-Sun] button and press RESET [RESET] button simultaneously. Release RESET [RESET] button only and make sure that all marks on the remote controller display are indicated, then release ① [START/STOP] button and Mon-Sun [Mon-Sun] button. Remote controller now enters "Intermittent Fan Control Change Mode".



2. Press [ROOM TEMPERATURE setting] [∧(UP)]/[V(DOWN)] buttons.
(The intermittent pattern changed with indoor unit beep sound.)



	Pattern 1	Pattern 2	Pattern 3
Single Model	Continuous	30sec ON / 210sec OFF repeatedly	50sec ON / 190sec OFF repeatedly
Multi Model	30sec ON / 210sec OFF repeatedly	50sec ON / 190sec OFF repeatedly	Continuous

NOTE :
(1) The indication of the selected intermittent pattern will disappear after 10 seconds.
(2) The selected intermittent pattern will remain unchanged after the unit is turned off.

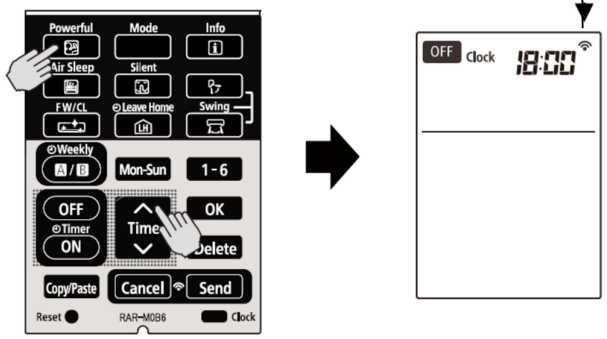
9.1.5. FAN SPEED SETTING IN THERMO OFF IN COOLING

The fan speed in Cooling Mode during thermo off can be changed by the remote controller.
(This procedure shall be implemented strictly by service personnel only.)
It is possible to return it to the default setting.

PROCEDURE

Press POWERFUL [POWERFUL] button and TIME [TIME ∧(UP)] button simultaneously for about 5 seconds when the remote controller is OFF.

Transmission sign lights up with beep from indoor unit simultaneously.



Beep sound pattern : 1) Default setting : Short beep
2) Changed setting : Double beep

	Fan speed during thermo off
Default Setting	Ultra low
Changed Setting	Set fan speed (When auto fan speed is set, the fan speed is low)

NOTE :
(1) The selected fan speed will remain unchanged after the unit is turned off.
(2) If Timer reservation has been set, it will be canceled.
(3) During time setting and timer setting, this operation cannot be set.

9.1.6. ERROR CODE INFORMATION

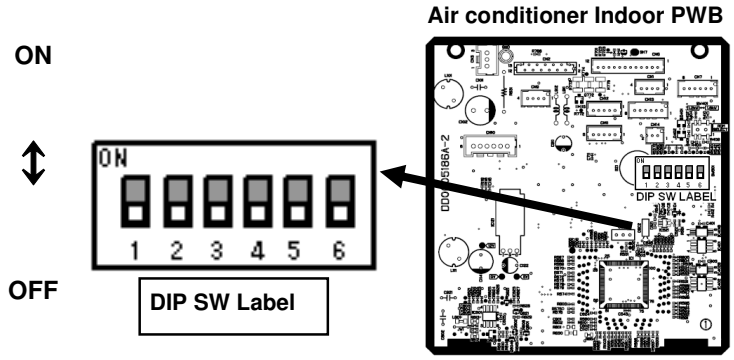
1. In case failure occurs to the air conditioner, by pressing INFO (INFO) button, an error code will be displayed.
2. Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press INFO (INFO) button.
3. Wait for 2 seconds for signal transmission and the error code will be displayed.

	TIMER LAMP BLINKING	LED1351 BLINKING	CODE	MEANING
INDOOR	-	-	000 00	Normal
	1 time		001 00	Refrigerant cycle fault
	2 times	-	-	Outdoor unit is under forced operation
	3 times	9 times	003 00	Communication error between indoor and outdoor units
	9 times	-	009 00	Indoor thermistor
	10 times	-	010 00	Abnormal rotating numbers
	12 times	-	012 00	Outdoor interface error
	13 times	-	013 00	IC401 data reading error
OUTDOOR	4 times	2 times	002 01	Peak current cut
	4 times	3 times	003 01	Compressor abnormal low speed rotation
	4 times	4 times	004 01	Compressor switching failure
	4 times	5 times	005 01	Overload lower limit cut
	4 times	6 times	006 01	OH thermistor temperature rise
	4 times	7 times	007 01	Abnormal outdoor thermistor
	4 times	8 times	008 01	Acceleration defective
	4 times	9 times	009 01	Communication error
	4 times	10 times	010 01	Abnormal power source
	4 times	11 times	011 01	Fan stop for strong wind
	4 times	12 times	012 01	Fan motor fault
	4 times	13 times	013 01	EEPROM reading error
	4 times	14 times	014 01	Active converter defective
	4 times	15 times	015 01	Abnormal PWB circuit

	TIMER LAMP BLINKING	LD1351 Lit LD1352 BLINKING	CODE	MEANING
OUTDOOR	4 times	1 times	071 01	Overheat thermostat
	4 times	2 times	072 01	Defrost thermostat
	4 times	3 times	073 01	Outdoor temperature thermostat
	4 times	4 times	074 01	Narrow pipe thermostat (indoor 1)
	4 times	5 times	075 01	Wide pipe thermostat (indoor 1)
	4 times	6 times	076 01	Narrow pipe thermostat (indoor 2)
	4 times	7 times	077 01	Wide pipe thermostat (indoor 2)
	4 times	8 times	078 01	Narrow pipe thermostat (indoor 3)
	4 times	9 times	079 01	Wide pipe thermostat (indoor 3)
	4 times	10 times	080 01	Narrow pipe thermostat (indoor 4)
	4 times	11 times	081 01	Wide pipe thermostat (indoor 4)
	4 times	12 times	082 01	Narrow pipe thermostat (indoor 5)
	4 times	13 times	083 01	Wide pipe thermostat (indoor 5)

9.1.7. ADDITIONAL FUNCTION VIA DIP-SWITCH SETTINGS

A new DIP Switch is available on the PWBs of the indoor unit that provide additional functions via the settings on the switches.



Pin No.	Function	Switch Position / Setting					
1	AUTO RESTART function	OFF	Enable	ON	Disable		
2	DRY CONTACT function	OFF	Disable	ON	Enable		
3	DRY CONTACT Logic Select	OFF	HI Input Active	ON	LO Input Active		
4	HEATING / COOLING ONLY MODE SELECT	OFF	NORMAL (HEAT AND COOL)	OFF	HEATING ONLY	ON	COOLING ONLY
5		OFF		ON		OFF	
6	REMOCON ID SELECT ❖1	OFF	SELECT ID A	ON	SELECT ID B		

NOTE:

❖1 The setting of pin no. 6 is disabled for this model. Please refer to **9.1.3. SETTING THE PREVENTION OF MUTUAL INTERFERENCE**.

9.1.8. AUTO RESTART FUNCTION

The AUTO RESTART function can be enabled or disabled by setting Pin No. 1 on the DIP SWITCH above to the ON or OFF position accordingly.

9.1.9. HEATING/COOLING ONLY MODE SELECTION

When this function is enabled, the operation mode could be locked to either Heating Only (Heating or Fan) or Cooling Only (Cooling, Fan or Dehumidifying) by setting the Pin No. 4 and 5 accordingly.

LOCKED MODE	REMARKS
HEATING ONLY	Unit will not enter into Cooling mode although cooling mode is selected using the remote controller.
COOLING ONLY	Unit will not enter into Heating mode although heating mode is selected using the remote controller.

10 OPTION LIST

10.1. WIRED REMOTE CONTROL SPX-RCDB1

This controls the operation function and timer setting of the room air conditioner.
* Maximum length cable can be up to 49.21ft (15m). Use extension cable SPX-WKT5MB 16.4ft (5m)

(SPX-RCDB1)

RAS-SH09RHLAE
RAS-SH12RHLAE
RAS-SH18RHLAE
RAS-SH24RHLAE

BUTTONS	FUNCTION
	MODE Selector Use this button to select the operationg mode. Every time you press this button, the mode will change from (AUTO) → (HEAT) → (DEHUMIDIFY) → (COOL) and → (FAN) cyclically.
FAN	**FAN SPEED Selector Button** This determines the fan speed. Every time you press this button, the airflow rate will change from (AUTO) → (HIGH) → (MED) → (LOW) → (SILENT) (This button allows selection of optimal or preferred fan speed for each operation mode).
	ON/OFF button Press this button to start operation. Press it again to stop operation.
	SLEEP button Use this button to set the SLEEP timer.
SET	**SET button** Timer setting reservation.
OFF	**OFF button** Select the turn OFF timer.
ON	**ON button** Select the turn ON timer.
CANCEL	**CANCEL button** Cancel timer reservation.
	AUTO SWING (Vertical) button Controls the angle of the horizontal air deflector.
Temp	**ROOM TEMPERATURE setting button** Value will change quicke when keep pressing.

10.1.1. SHIFT VALUE

1. Press and hold ⏻ (ON/OFF) button and ON (ON TIMER) button at the same time while giving a single press on the RESET button until remote controller now enter 'Shift value change mode'.
2. Press ⏻(ON/OFF) button so that the display indicates FAN (FAN) speed.
3. Select FAN(FAN SPEED) button to choose Heating Shift or Cooling Shift Mode.

   By setting fan speed to HIGH or MED , it will go to Cooling Shift mode.
   By setting fan speed to LOW or SILENT , it will go to Heating Shift mode.

4. Press Temp (ROOM TEMPERATURE) button to change the shift value (23°F ~ 0 ~ 41°F).

5. Press ⏻ (ON/OFF) button to end 'Shift value setting mode'.

NOTE:
1. There are total of 11 shift values.
2. The changed shift value will remain unchanged after turned off the power.

10.1.2. ERROR CODE INFORMATION

1. In case failure occurs to the air conditioner, the error code will constantly appear on the wired remote controller display.

	TIMER LAMP BLINKING	LD1351 BLINKING	CODE	MEANING
INDOOR	-	-	-	Normal
	1 time	-		Refrigerant cycle fault
	2 times	-	-	Outdoor unit is under forced operation
	3 times	9 times		Communication error between indoor and outdoor units
	9 times	-		Indoor thermistor
	10 times	-		Abnormal rotating numbers
	12 times	-		Outdoor interface error
	13 times	-		IC401 data reading error

OUTDOOR	4 times	2 times		Peak current cut
	4 times	3 times		Compressor abnormal low speed rotation
	4 times	4 times		Compressor switching failure
	4 times	5 times		Overload lower limit cut
	4 times	6 times		OH thermistor temperature rise
	4 times	7 times		Abnormal outdoor thermistor
	4 times	8 times		Accelaration defective
	4 times	9 times		Communication error
	4 times	10 times		Abnormal power source
	4 times	11 times		Fan stop for strong wind
	4 times	12 times		Fan motor fault

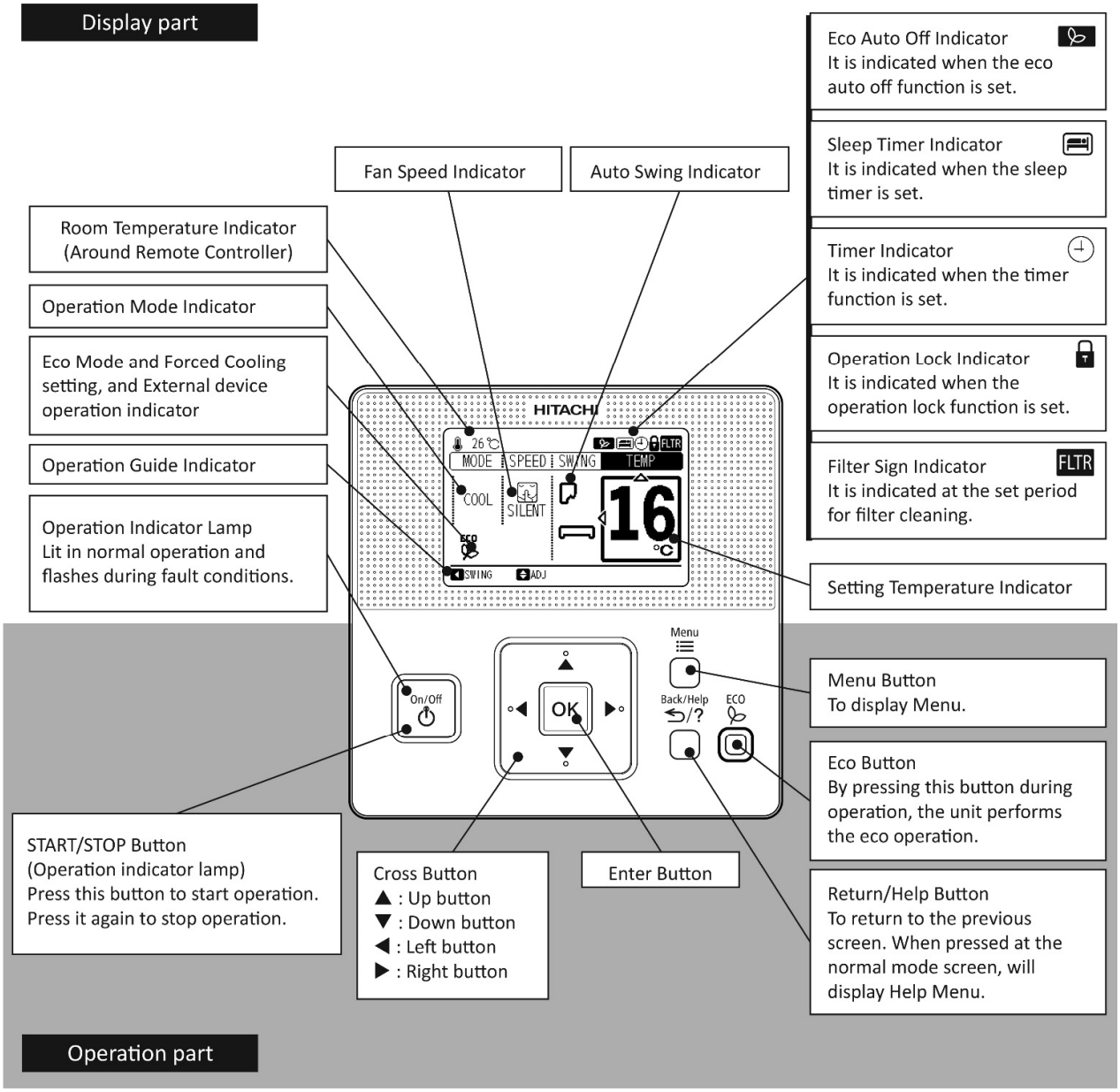
	4 times	13 times		EEPROM reading error
	4 times	14 times		Active converter defective
	4 times	15 times		Abnormal PWB circuit
		LD1351 Lit LD1352 BLINKING		
	4 times	1 time		Overheat thermostat
	4 times	2 times		Defrost thermostat

	TIMER LAMP BLINKING	LD1351 Lit LD1352 BLINKING	CODE	MEANING
OUTDOOR	4 times	3 times		Outdoor temperature thermostat
	4 times	4 times		Narrow pipe thermostat (indoor 1)
	4 times	5 times		Wide pipe thermostat (indoor 1)
	4 times	6 times		Narrow pipe thermostat (indoor 2)
	4 times	7 times		Wide pipe thermostat (indoor 2)
	4 times	8 times		Narrow pipe thermostat (indoor 3)
	4 times	9 times		Wide pipe thermostat (indoor 3)
	4 times	10 times		Narrow pipe thermostat (indoor 4)
	4 times	11 times		Wide pipe thermostat (indoor 4)
	4 times	12 times		Narrow pipe thermostat (indoor 5)
	4 times	13 times		Wide pipe thermostat (indoor 5)

10.3. WIRED FULL DOT REMOTE – SPX-WKT4

10.3.1. NAMES AND FUNCTIONS OF REMOTE CONTROLLER

*Maximum length cable can be up to 49.21ft (15m). Use extension cable SPX-WKT5M 16.4ft (5m)



10.3.2. SERVICE MENU

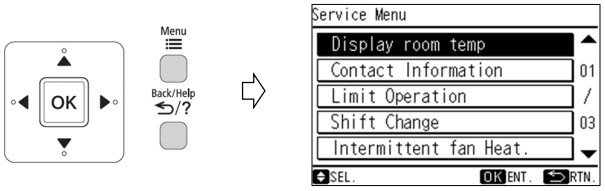
Various setting functions are displayed in the service menu. This procedure shall be implemented strictly by service personnel only. Refer to the following sections for each function.

NOTE

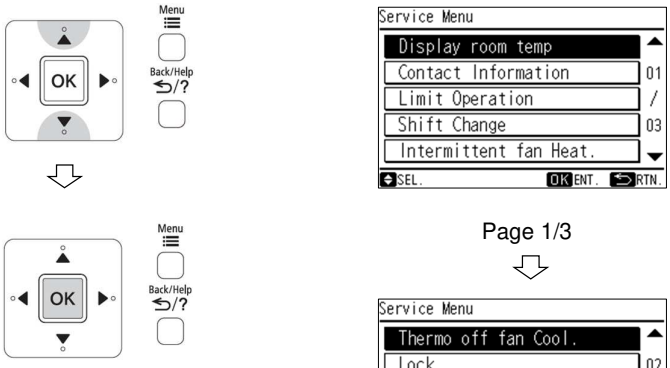
☒ : Unable to set

If the function with " ☒ " is selected from the menu, "Setting Disabled" will be displayed on the lower screen.
The image in case of Celsius setting of setting temperature is shown in this manual as an example.

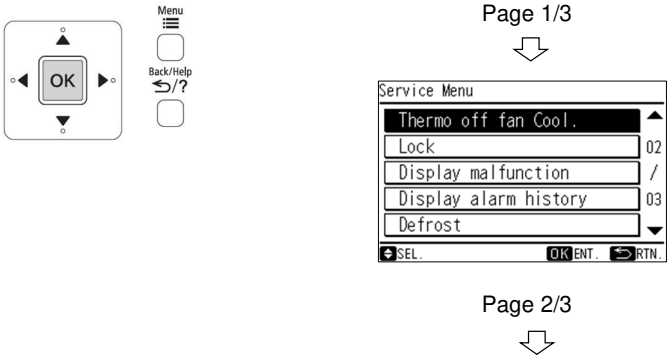
1 Press and hold Menu and Back/Help simultaneously for at least 3 seconds during the normal mode.
The service menu will be displayed.



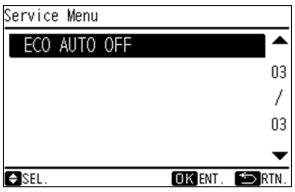
2 Select the "Service Menu" function by pressing "▲" or "▼" and press "OK".
(" ☒ " will be displayed if the function is not available.)



Page 1/3



Page 2/3



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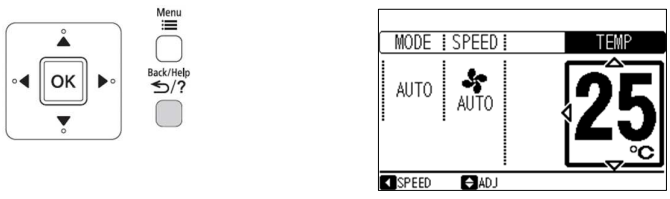
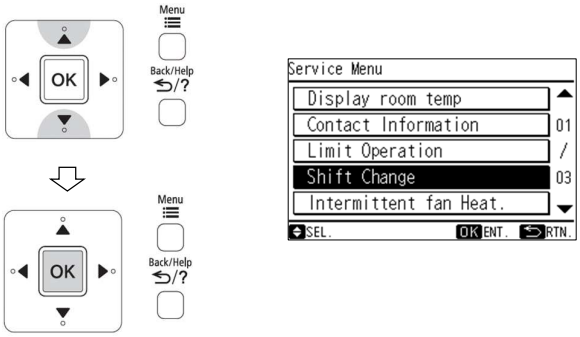
3 Press " Back/Help "(return/help) to return to the normal mode.



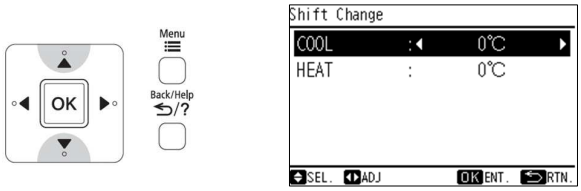
10.3.3. SHIFT VALUE CHANGE

The shift value setting temperature for cooling and heating mode operation can be changed.

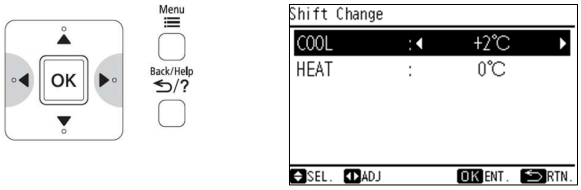
1 Select "Shift Change" from the service menu and press "OK". The shift change setting will be displayed.



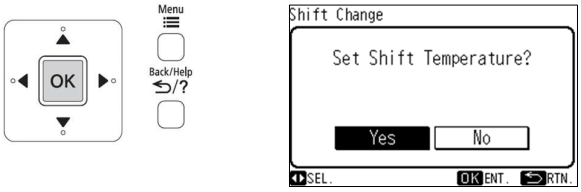
2 Press "▲" or "▼" to select the operation mode.
("COOL" or "HEAT")



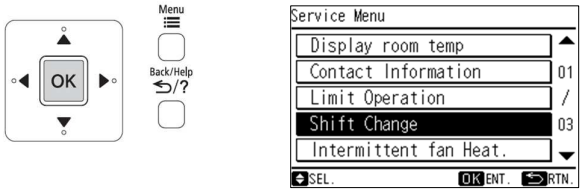
3 By pressing "◀" or "▶", the shift value will be changed as below.
"....+5ºC ↔ -5ºC ↔ -4ºC ↔ -3ºC ↔ -2ºC ↔ -1ºC ↔ 0ºC ↔ +1ºC ↔ +2ºC ↔ +3ºC ↔ +4ºC ↔ +5ºC..." ("....+10ºF ↔ -10ºF ↔ -8ºF ↔ -6ºF ↔ -4ºF ↔ -2ºF ↔ 0ºC ↔ +2ºF ↔ +4ºF ↔ +6ºF ↔ +8ºF ↔ +10ºF...")



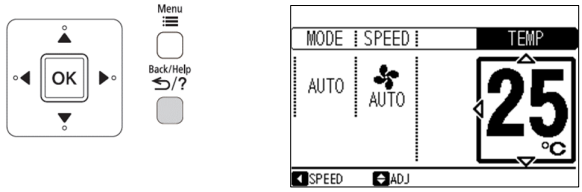
4 Press "OK" to finish the shift value setting. The confirmation screen will be displayed.



5 Select "Yes" by pressing "◀" or "▶" and press "OK". The setting will be confirmed and the screen will return to the service menu.



6 Press "Back/Help" "(return/help) to return to the normal mode.



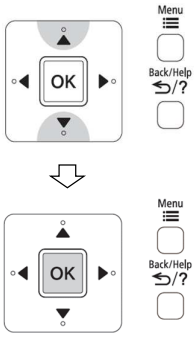
NOTE

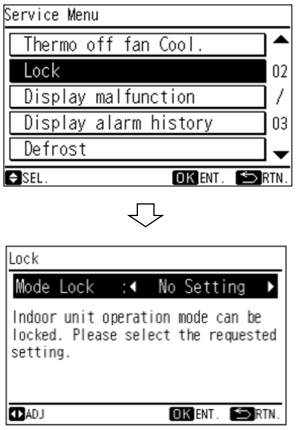
- When the setting is done, fan speed will be changed to “silent”.
- This setting cannot use during operation.
- The “shift value change” setting will remain unchanged after the unit is turned off.
- Some indoor units are available from -3°C (-6° F) to +3°C (+6° F) only of shift change. In case of that, shift change setting of -5°C (-10° F), -4°C (-8° F), +4°C (+8° F) or +5°C (+10° F)will not be reflected to indoor unit.

10.3.4. OPERATION LOCK

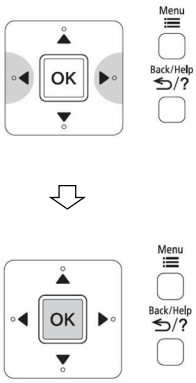
This function is used to lock the operation mode from the remote controller.
The remote controller can be set to fix the "Heating" mode (including "Fan"), "Cooling" mode and "Dehumidifying" mode (including "Fan") operations.

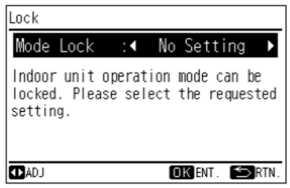
1 When unit is OFF, select "Lock" from the service menu and press "OK".
The screen of "Mode Lock" selection will be displayed.



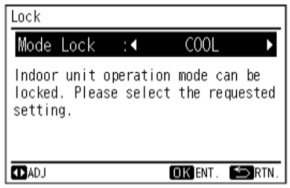


2 By repeatedly pressing " ◂ " or " ▸ ", the indication is changed in order of "No Setting" <---> "COOL" <---> "HEAT"
Select the function target and press "OK".
The confirmation screen will be displayed.

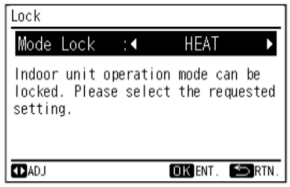




When this function is not used

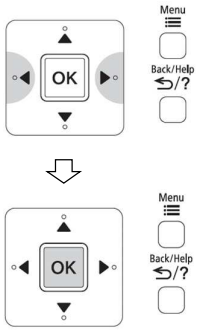


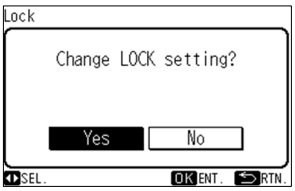
When "Cooling" mode lock is selected



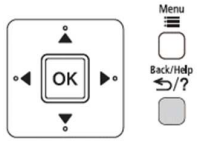
When "Heating" mode lock is selected

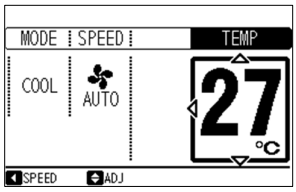
3 Select "Yes" by pressing " ◂ " or " ▸ " and press "OK".
The setting will be confirmed and the screen will return to the service menu.





4 Press " Back/Help " to return to the normal mode.





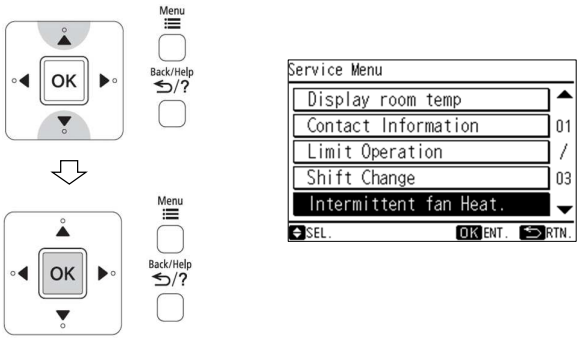
Example: Select "Cooling" mode lock

NOTE:
The operation lock setting will remain unchanged after the unit is turned off.

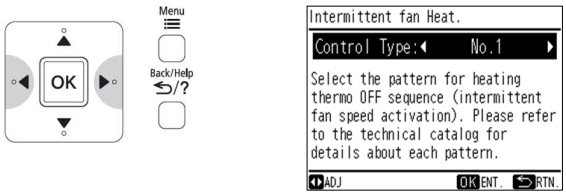
10.3.5. INTERMITTENT FAN CONTROL

The intermittent fan control during thermo off in Heating mode can be changed

1 Select "Intermittent fan Heat." from the service menu and press "OK".
The intermittent fan control setting will be displayed.

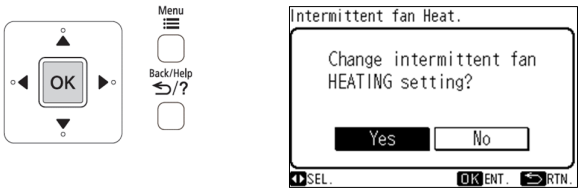


2 By pressing "◂ " or " ▸", the "Control Type" will be changed as below.
".... No.1 <---> No.2 <---> No.3 <---> No.1 ..."

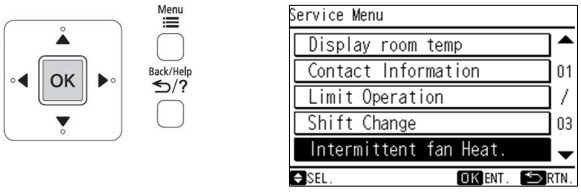


	Single model	Multi model
No 1	Continuous	30 sec ON / 210 sec OFF repeatedly
No 2	30 sec ON / 210 sec OFF repeatedly	50 sec ON / 190 sec OFF repeatedly
No 3	50 sec ON / 190 sec OFF repeatedly	Continuous

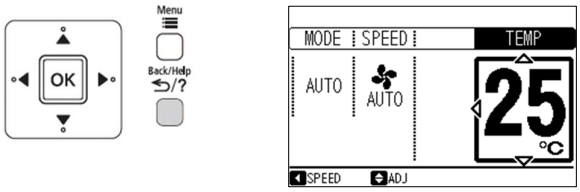
3 Press "OK" to finish the intermittent fan control setting.
The confirmation screen will be displayed.



4 Select "Yes" by pressing "◂ " or " ▸" and press "OK".
The setting will be confirmed and the screen will return to the service menu.



5 Press " Back/Help ⮌/? " to return to the normal mode.



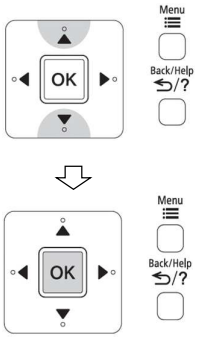
NOTE

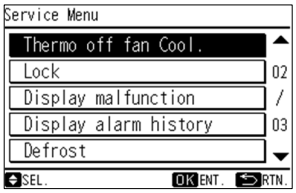
- This setting cannot use during operation.
- The intermittent fan control setting will remain unchanged after the unit is turned off.

10.3.6. FAN SPEED DURING THERMO OFF

The fan speed during thermo off in Cooling mode can be changed.

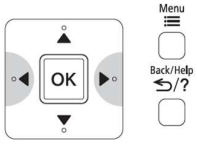
1 Select "Thermo off fan Cool." from the service menu and press "OK".
The fan speed during themo off setting will be displayed.

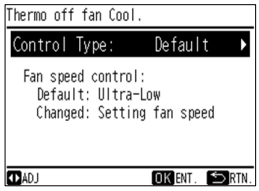




2 By pressing " ◂ " or " ▸ ", the "Control Type" will be changed as below.

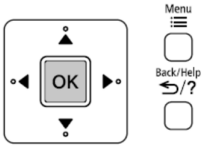
"Default" <---> "Changed"

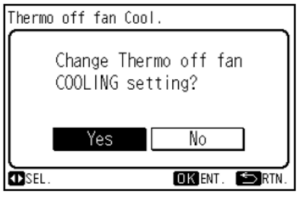




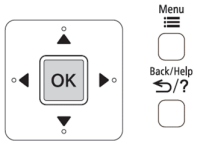
	Fan speed during thermo off
Default	Ultra low
Changed	Set fan speed (When auto fan is set, the fan speed is low)

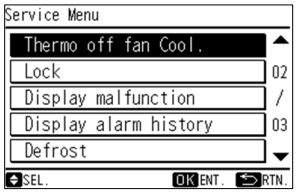
3. Press “OK” to finish the thermo off fan control setting. The confirmation screen will be displayed.



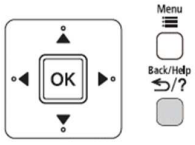


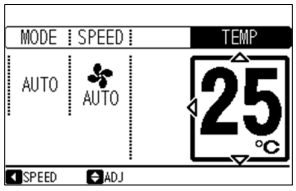
4 Select "Yes" by pressing " ◂ " or " ▸ " and press "OK".
The setting will be confirmed and the screen will return to the service menu.





5 Press " Back/Help ⮌/? " to return to the normal mode.





NOTE:

- This setting cannot use during operation.
- The fan speed during thermo off setting will remain unchanged after the unit is turned off.

10.4. H-LINK ADAPTOR – PSC 6RAD

10.4.1. SAFETY SUMMARY

DANGER:

– DO NOT pour water into the remote control switch (hereafter called "controller"). This product is equipped with electrical parts. This will cause serious electrical shock.

WARNING:

– DO NOT perform installation work and electrical wiring connection by yourself. Contact your distributor or dealer of HITACHI and ask then for installation work and electrical wiring by service person. The specified cable should be used to connect (i) room air conditioner and adaptor, and (ii) controller and adaptor.

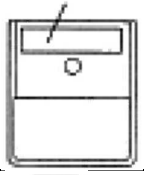
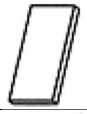
CAUTION:

– DO NOT install the indoor unit, outdoor unit, controller and cable as such places as:
  – where there is oil vapor and dispersion of oil
  – where there is sulfuric environment (near the hot springs)
  – where there is a flammable gas
  – where there is salty environment (near the sea)
– DO NOT install the indoor unit, outdoor unit, controller and cable within approximately 9.84ft (3 meters) from strong electromagnetic wave radiators, such as medical equipment. In case that the controller is installed in a place where there is electromagnetic wave direct-radiation, shield the controller and cables by covering with the steel box and running the cable through the metal conduit tube.
– In case that there is electric noise at the power source for the indoor unit, provide a noise filter.

10.4.2. INSTALLATION WORK

Before installation

Check the contents and the number of the accessories in the packing.

Adaptor	 **With two 1.8m cables (70 inches cables)**
1 piece of cover for hiding the covering	**Attached 2 sided tapes** 
Two-sided tape for attaching to Adaptor	 **4.33x1.57x0.12 inch (110x40x3mm)**
2 connectors for H-Link connection	
2 tapping screws for attaching to wall	 **ϕ3.0 x 10mm (ϕ0.120 x 3/8 inch)**
2 screws for attaching to wooden wall	 **ϕ3.1 x 16mm (ϕ0.122 x 5/8 inch)**

1) RAC adaptor can be installed to the wall as well as on the air conditioner itself
2) Install RAC adaptor in the vertical surface as shown below.

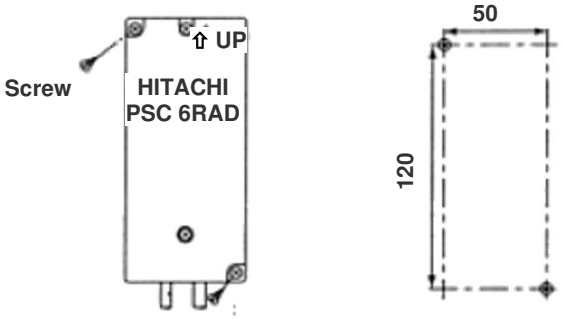
Upper side

Mark "⇧ UP"

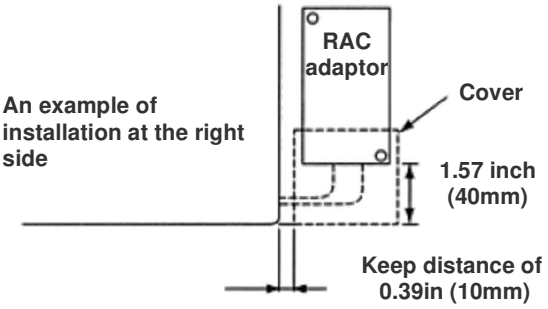
Wiring outlet

Bottom side

3) Installation procedure
   a) When installing to the wall.
      i) Fix the adaptor with 2 screws. Tapping screw is for metal surface, and other screw is for wooden surface.



      ii) When using the cover
      It can be installed at the right and left side of room air conditioner. Fix the cover and RAC adaptor with the two-sided tape (accessory).

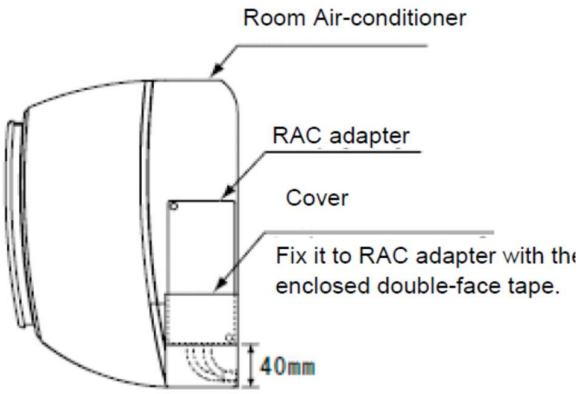


   b) When installing on the room air-conditioner

In case that it cannot be installed to the wall due to the space or material problem, install the RAC adaptor with the two-sided tape (accessory) on the room air-conditioner.

i) Confirm if the piping cover of the unit can be removed when performing the service maintenance, and then fix the RAC adaptor in the side of room air-conditioner with two-sided tape. (Available at the right as well as left side)

ii) Clean the surface to be installed with a dry cloth.



NOTE:

– Consider the following points since the adhesiveness changes according to the environmental conditions (temperature, humidity etc)

– The adhesiveness is decreased when there is humidity or oil.

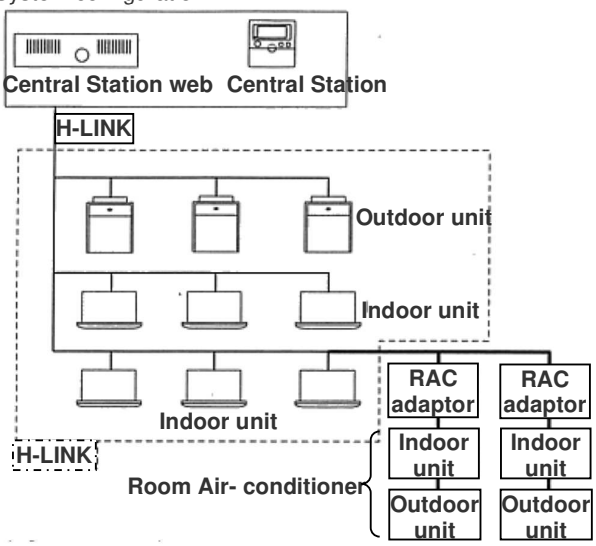
– Warm the adhesive part and installation place of the two-sided tape to avoid the decrease of the adhesiveness in case the ambient temperature is low.

– DO NOT touch the adhesive part by fingers nor re-attach it many times. The adhesiveness has decreased and the RAC adaptor may fall off.

– DO NOT apply any force within 24 hours after installation.

10.4.3. ELECTRICAL WIRING

System configuration



CAUTION:

– Turn OFF the power supply of the room air-conditioner of the central control device when performing the wiring work

– DO NOT run all the H-LINK cable or power supply cable along the other signal cable, or malfunction may occur due to the noise, etc. If it is required to run along the other transmission cable, separate the cable more than 11.8 inches. (30cm), or run the cable through the metal tube and earth the tube.

– Follow local codes and regulations when performing electrical wiring and earth wiring.

– Transmissions cable used in H-LINK shall be 2 cores cable (0.0011in(0.7mm^2) to 0.0019in(1.25mm^2) for model: VCTF, VCT, CVV, MVVX, CVVX, VVR, VVF) or 2 cores twisted pair cable (model: KPEV, KPEV-Spec). Total length of cable shall be below 3.2ft (1000mm).

– DO NOT use wire with more than 3 cores.

Internal components and Wiring connections

Check the contents and the number of the accessories in the packing.

- Access
  Open the cover by removing the ① and ② screws.

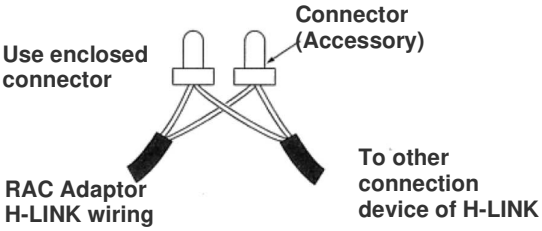
- Wiring Connection
  Connection with Room Air-Conditioner
  i) Remove the front cover of the room air-conditioner and the cover of electrical box.
  ii) The cable attached with the connector of the RAC adaptor shall be connected with the connector of indoor PCB

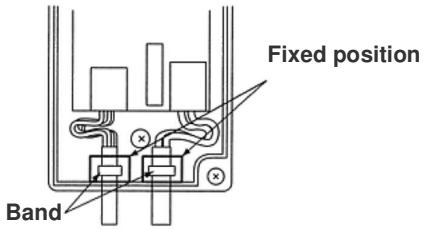
iii) Install the electrical box cover paying attention not to clamp the cable. Read the installation manual of each room air-conditioner for confirming how to connect and how to assemble the cable of the RAC adaptor.

CAUTION:
– Disconnect the power plug before performing this work
– Turn OFF the break power source in case the power is supplied from the outdoor unit.

- Connection of Transmission Cable

H-LINK transmission cable connecting to RAC adaptor shall be connected to H-LINK.

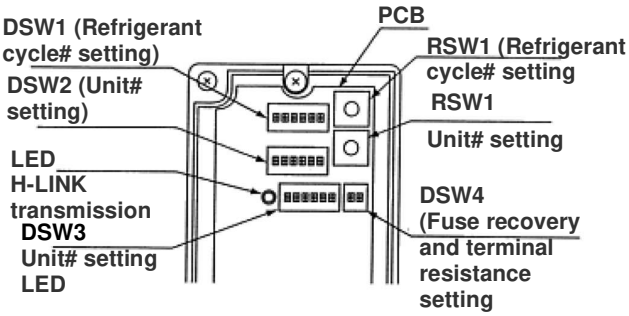




CAUTION:
– DO NOT connect incorrect wiring. It may cause the failure of the RAC Adaptor. Especially pay attention not to apply high voltage e.g. AC400/230V.
– DO NOT perform the wiring work while power to the central station or the RAC Adaptor is still being supplied. It may cause malfunction. Turn OFF devices when performing the wiring work.
– The RAC Adaptor side cable should not overload to the connector.
– DO NOT clamp the cable when attaching the RAC adaptor cover.
– Band should not be loose and in fixed position.

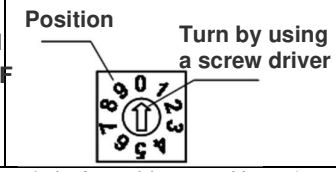
10.4.4. DIP SWITCH SETTING

1) Switch OFF the power of room air conditioner before setting the DIP switch. If the power is ON, the settings are INVALID.
2) The position of the DIP switch is shown below.

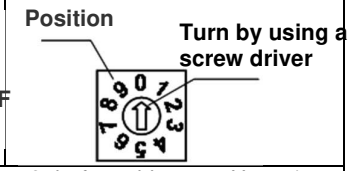
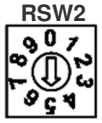


CAUTION:
– DO NOT turn ON various pins of DSW1 and DSW2

3) Set the refrigerant cycle# by RSW1 and DSW1

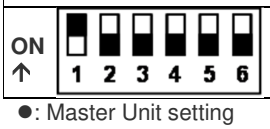
DSW1 (Ten digit)	RSW1 (Last digit)
	
DSW1 and RSW1 are set “0” before shipment. Up to 15 cycles can be set.	
E.g. Setting in Ref No. 5  No. 1 pin is OFF	 The position is Set 5

4) Set the unit No. by RSW2 and DSW2

DSW2 (Ten digit)	RSW2 (Last digit)
	
DSW2 and RSW3 are set “0” before shipment. Up to 15 cycles can be set.	
E.g. Setting in Unit No. 15  No. 1 pin is OFF	 The position is Set 5

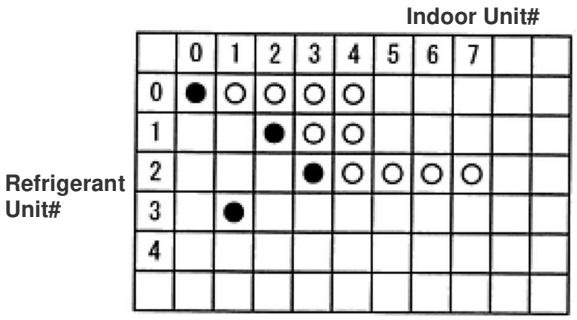
5) Slave unit.

In case of setting various RAC adaptors in the same refrigerant cycle, set the RAC adaptor with smallest Unit# as a master unit. In case of setting only one RAC adaptor in a refrigerant system, this adaptor should be a master unit. Set this procedure by DSW3.

Master Unit setting	Setting before shipping (slave unit setting)
	

●: Master Unit setting

○: Setting before Shipping (Slave Unit setting)

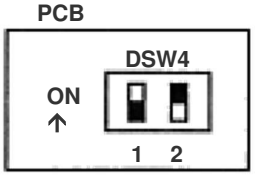


CAUTION:

– DO NOT set various main adaptors in the same refrigerant cycle.

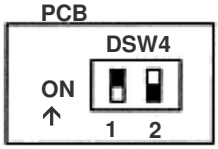
6) Procedure when applying 200V voltage to H-LINK wiring incorrectly.

In case of applying 200V voltage to H-LINK wiring incorrectly, the fuse installed in a transmission circuit on PCB will blow out. In this case, reconnect the wiring correctly and turn ON No. 2 pin of DSW4 on PCB. The transmission circuit can be recovered. (If applying this error again, the transmission circuit can not be recovered)



Turn ON No.2 pin of DSW4

7) Terminating resistance is set in whole H-LINK system.
   a) If H-LINK connecting devices like package air-conditioner are connected besides the RAC Adaptor, set the terminating resistance by those connecting devices. The terminating resistance should be set ON in only one position in whole H-LINK system.
   b) In case that H-LINK is connected only by the RAC adaptor, set the terminating resistance by the RAC adaptor. The terminating resistance should be set ON in only one position in whole H-LINK system.



Turn ON No.1 pin of DSW4

10.4.5. TEST RUN

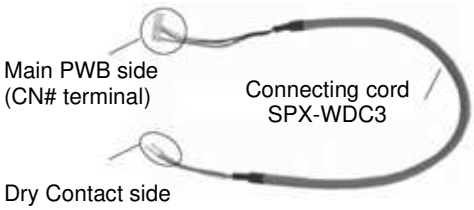
Test run should be performed in the following after finishing the installation, wiring and setting. Refer to the installation manuals enclosed with the control system equipment.

1) Confirmation of RAC Adaptor Connection
   Confirm if the RAC adaptor connection is recognized in the control system equipments. In case that it is not confirmed, check the transmission cable, refrigerant cycle #, indoor unit #, terminal resistance setting etc.
2) Registration
   Confirm if the RAC adaptor connection is recognized.
3) Confirmation of RUN/STOP Operation.
   Confirm if the room air-conditioner operate correctly by RUN/STOP from the central control system equipments. Check also if the room air-conditioner operation changes correctly by each setting.

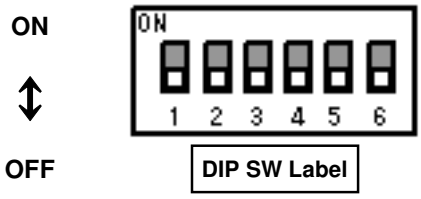
10.5. DRY CONTACT (SPX-WDC3) APPLICATION (USING DIP SWITCH)

The dry contact system enables the operation of the air conditioner indoor unit to be controlled by using external dry contacts (with non voltage) such as card-key controller or window for facilities such as hotels.

Table 1 (Applicable models and related information)

Optional Connecting cord Accessory SPX-WDC3		Model	DIP SW Label	CN#
	SPX-WDC3	RAS-SH09RHLAE RAS-SH12RHLAE RAS-SH18RHLAE RAS-SH24RHLAE	DSW1	CN6

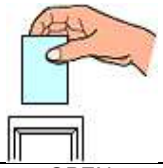
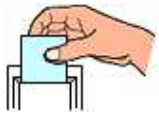
Note:
1) DRY CONTACT function is "Enable" by set pin No. 2 of the DIP SWITCH (refer to table 1 for the label) to ON position.
2) Select the proper setting for DRY CONTACT LOGIC INPUT pin No. 3 on DIP SWITCH (refer to Table 1 for the label)
   i) Set to OFF position (Hi Input) if the type of Dry Contact switch to be used (for the CARD KEY UNIT or Window) is of contact type a (Normally Open Type) as shown in below diagram.
   ii) Set to ON position (Lo Input) if the type of Dry contact switch to be used (for the CARD KEY UNIT or Window) is of contact type b (Normally Close Type) as shown in below diagram.



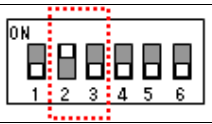
Pin No.	Function	Switch Position / Setting			
2	DRY CONTACT function	OFF	Disable	ON	Enable
3	DRY CONTACT Input Logic	OFF	HI Input Active	ON	LO Input Active

- Please decide the type of dry contact you will be using and set the position of the DIP Switch No. 2 and 3 accordingly

[1] CHECK DRY CONTACT OF CARD KEY UNIT

	AIR CONDITIONER Standby	AIR CONDITIONER Operating
CARD KEY (Door Switch)	REMOVE 	INSERT 
Contact type a	OPEN 	CLOSE 
Contact type b	CLOSE 	OPEN 

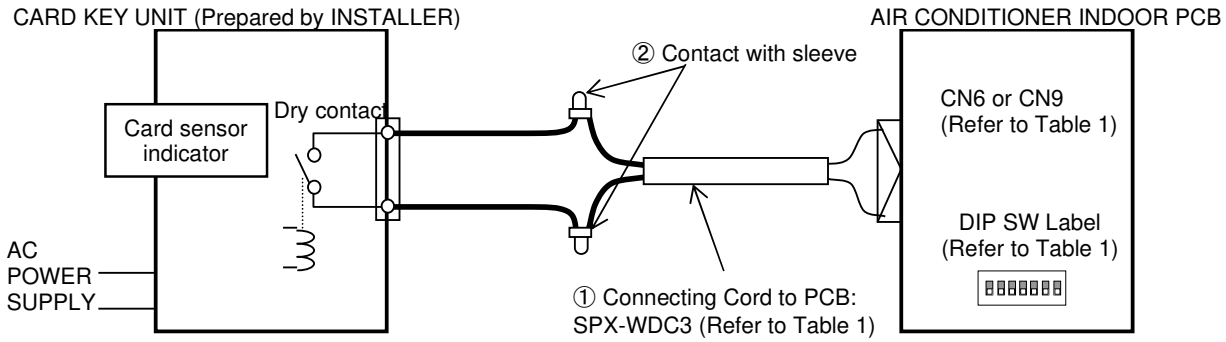
[2] SET THE POSITION OF DIP SWITCH

POSITION CONDITION OF DIP SWITCH	
INITIAL CONDITION (CARD KEY NO USE) 	No.2 : OFF No.3 : OFF
	**HI Input Active** No.2 : ON No.3 : OFF
	**LO Input Active** No.2 : ON No.3 : ON

After all connection has been done as below diagram, ON the breaker and push ON button of wireless remote controller or wired remote controller to operate the air conditioner unit.

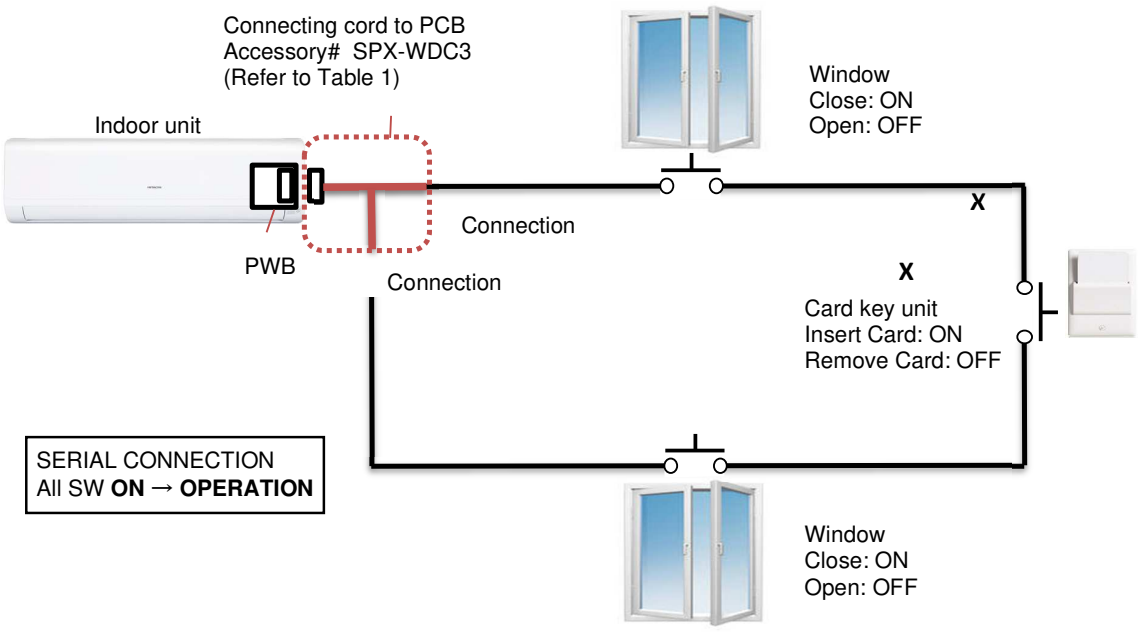
- When the CARD KEY is in insert condition, the air conditioner operation is allowable by remote controller.
- When the dry contact switch on the Card Key Unit is open (refer to diagram below for contact type a), the unit stops to operate (it takes 10 seconds to stop the unit operation after the dry contact switch on the card key turns off) and vice versa.
- When the card key is removed from the Card Key Unit, the wireless remote controller cannot be used.
- When the card key is removed from the Card Key Unit, the wired remote controller LCD display is activated; however it has no control over the unit.
- The suitable accessory Connecting Cord (accessory code#: SPX-WDC3) need to be used to connect the Card Key Unit's dry contact switch to the connector on the control board of the indoor unit. Please refer to Table 1 to select suitable accessory code# for the concerning indoor model.

Example of wiring connection to Card Key Unit will be as below (reference only)

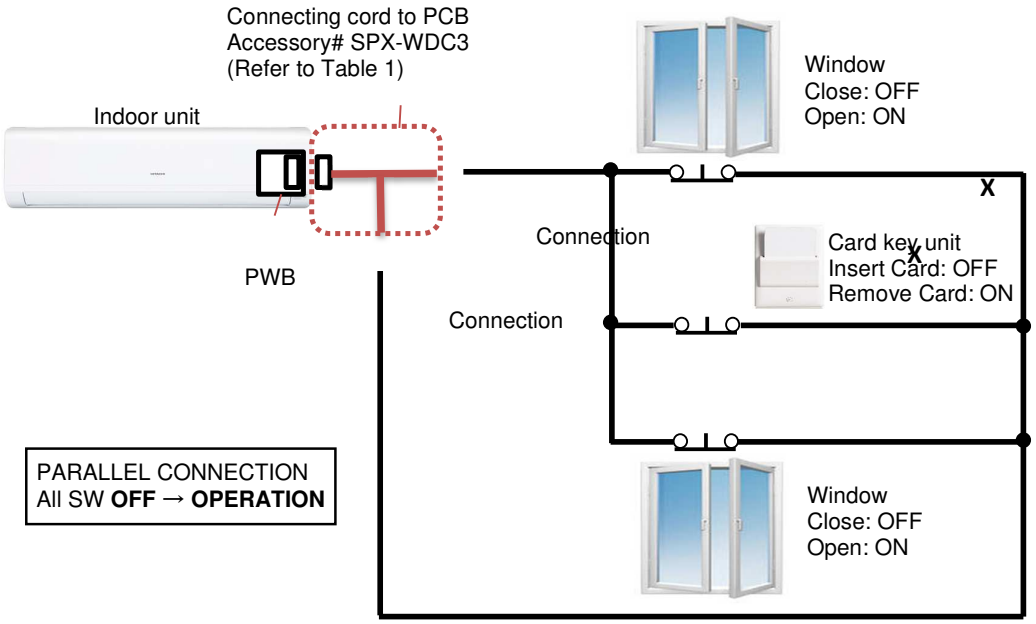


- CONNECTION EXAMPLE

i. Pin No. 3 of DIP SWITCH is set to OFF position (HI Input Active) for Dry Contact Type a

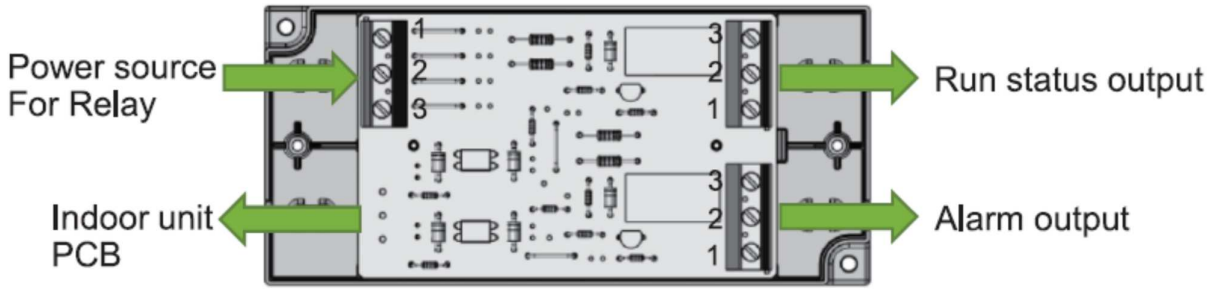


ii. Pin No. 3 of DIP SWITCH is set to ON position (LO Input Active) for Dry Contact Type b



Please refer to the actual manual supplied with the optional connecting cords SPX-WDC3 for more details.

10.6. RUN STATUS AND ALARM SIGNAL – SPX-WDC8



When operating RAC, Run Status signal is output
When operation stops, the signal disappears.
When RAC gets malfunction, alarm signal is output.
Each signal has to be taken out through the relay kit

The relay kit must to be used because of noise interference. The noise will cause air-condition failure.
The voltage from customer's home supply to adapter must be in the 5 ~ 24V, the current is less than 10mA.
If the voltage is lower than 5V, optocouplers will not be in action; once the voltage is higher than 24V,optocouplers adapter will be damaged.
Load side is a high voltage line, please be careful from electric shock and install the indication lamp as near as possible to the relay kit.
The maximum length of the wiring cable should be below 100m.

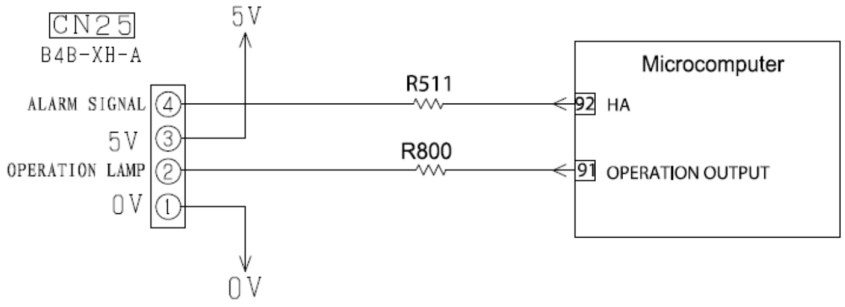


Fig 13-1

Fig. 13-1 is control circuit of run status and signal output in main PWB. The pin ② of CN25 is used to show run status and the pin ④ of CN25 is used to warn people when failure occurrence.
If customer want to use this function, need to use the adapter (sold separately) to achieve it. The adapter is an optional and the detail circuit refer to following circuit.

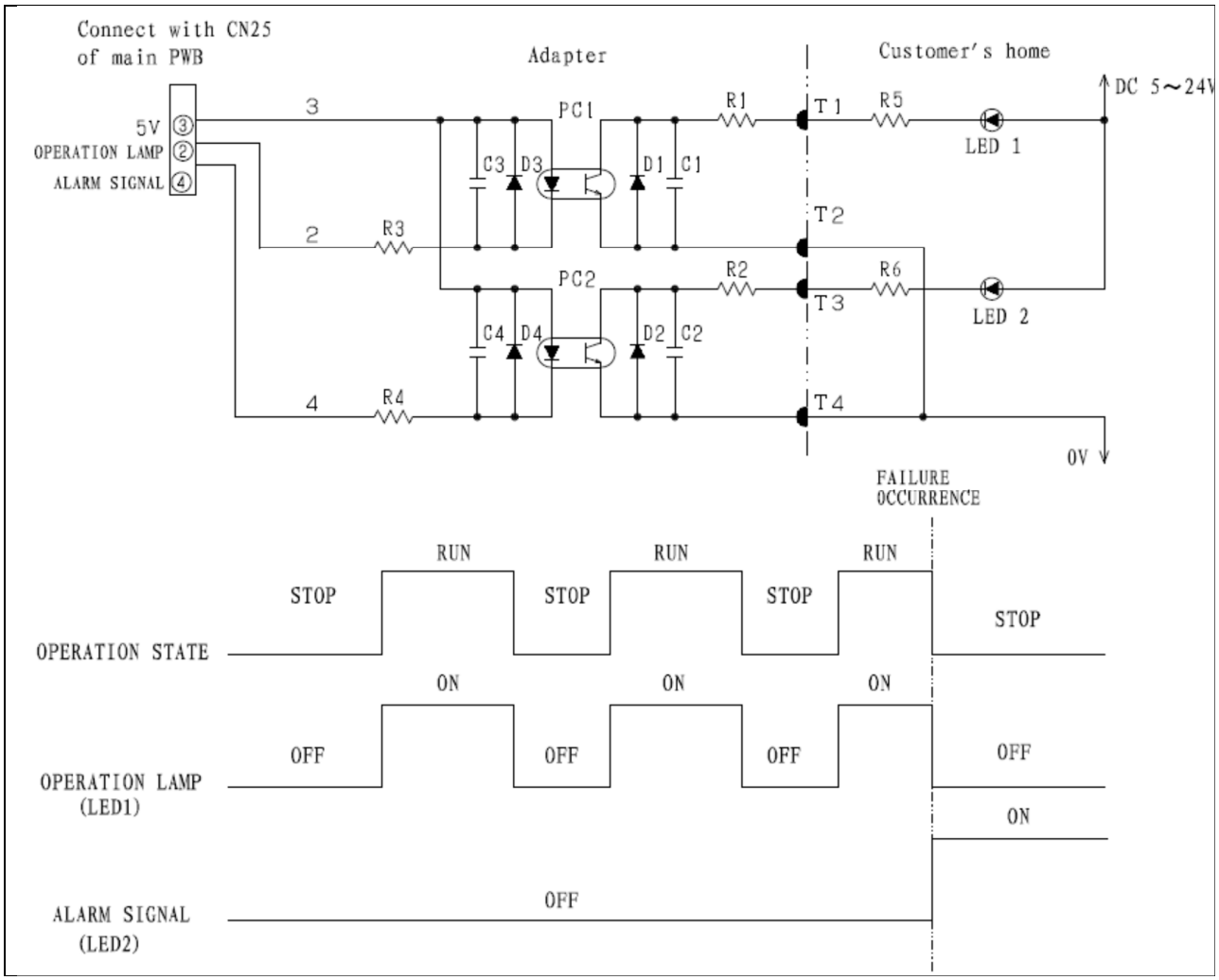


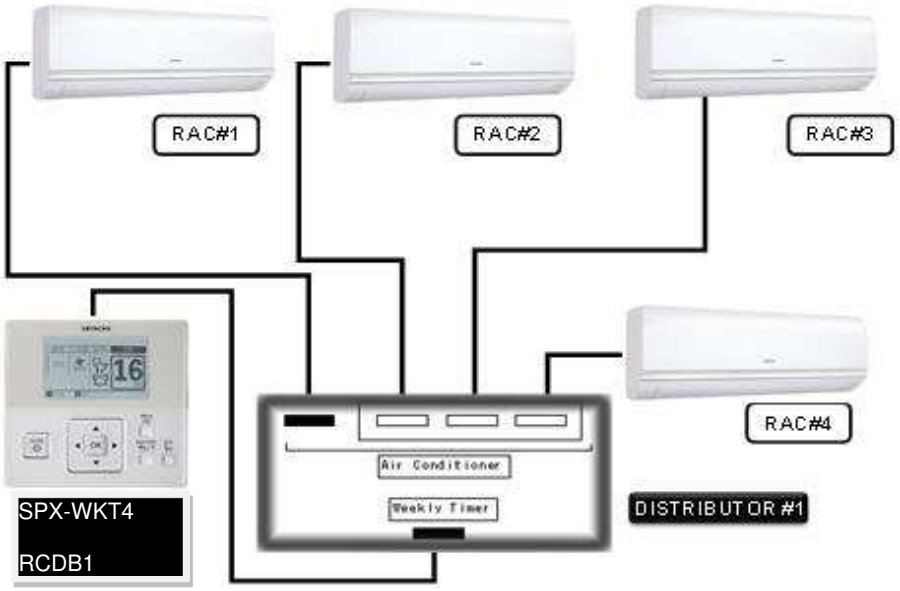
Fig. 13-2

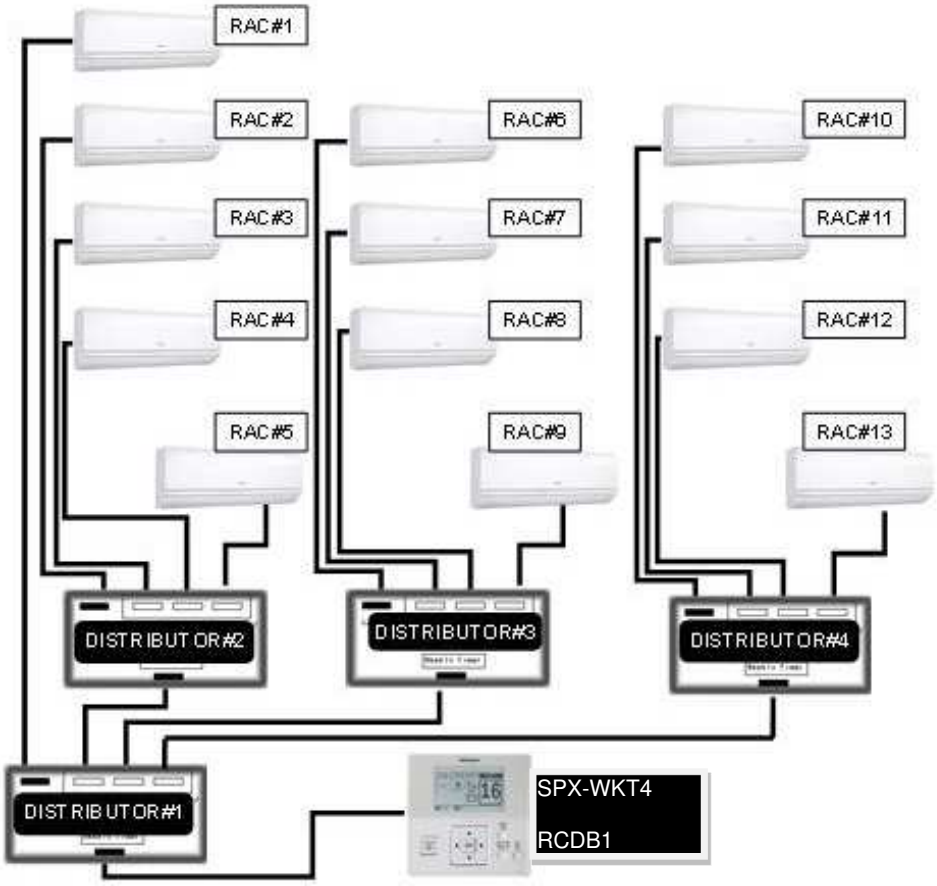
LED1 is on when air-conditioner is running and is off when air conditioner is stopping. We can know the status of air conditioner by LED1.
LED2 is off when air conditioner is in normal condition and is on when air conditioner is in failure mode. We can repair it in time.
The brightness of the lamp (LED1, LED2) can be determined by adjusting the resistance (R5, R6) value.

10.7. DISTRIBUTOR – SPX-DST1

The optional distributor is to be used together with the wired remote controller when there is a need to centralize the control of multiple indoor units using only a single wired remote controller.

A single distributor could be connected further to 3 separate distributors so that up to 13 units of indoor could be controlled by a single wired remote controller.





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