MINI-SPLIT SYSTEMS SERVICE MANUAL
MCB/MWCB and MHB/MWHB Series Unit Information

100041 5/2022

Please refer to 100042 for indoor and outdoor unit error codes and component diagnostics.

MWCB / MWHB Wall Mount Single-Zone Indoor Unit

MCB / MHB Single-Zone Outdoor Units

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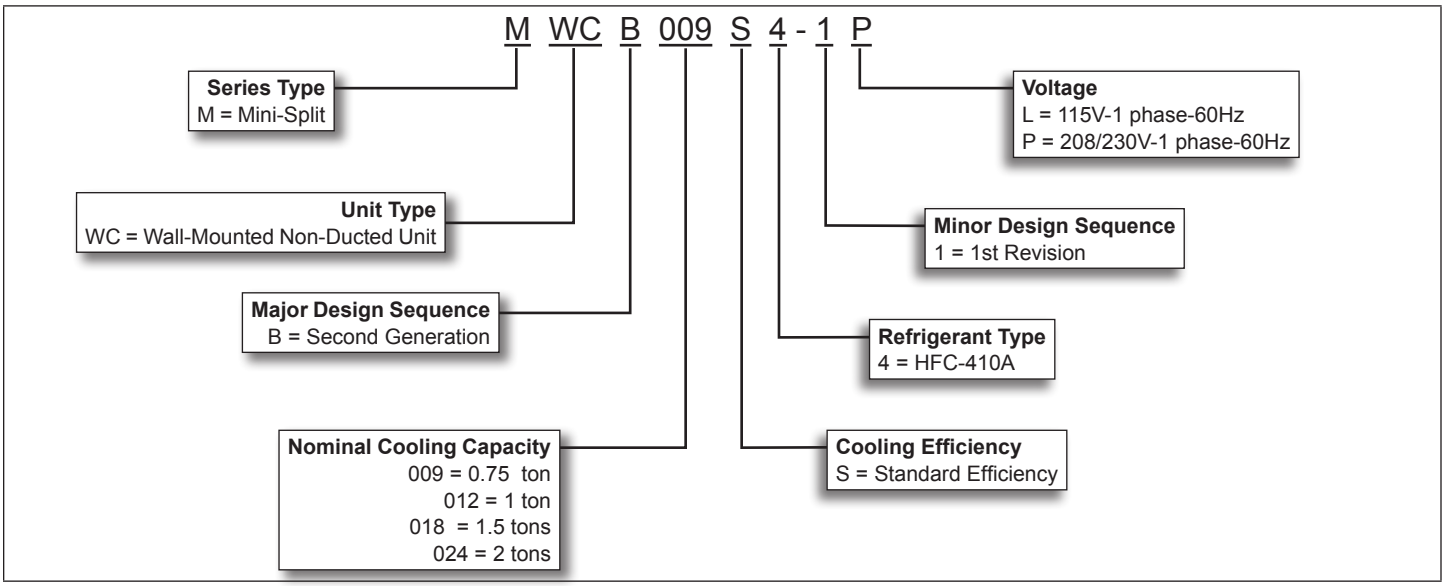
1. Indoor Units

1.1. Model Number Identification



1.2. Indoor Unit Specifications

Indoor Unit Model No.	MWCB009S4	MWCB012S4		MWCB018S4	MWCB024S4
Nominal Size - Tons	0.75	1		1.5	2
Power Supply - 60 Hz - 1 phase	208/230V	115V	208/230V	208/230V	208/230V
Rated load amps	3.13	8.5	4.2	6.8	9.3
Output (W)	13	20	13	30	58
Room Temperature Range (°F) Cooling	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90
Air Volume - cfm (High/Medium/Low)	246 / 205 / 147	333 / 253 / 211	324 / 232 / 194	471 / 353 / 306	588 / 471 / 400
Sound Data (dBA) - Low/Medium/High	35.0/31.0/22.5	40.5/35.5/33	40/35.5/30.5	46/38.5/31.5	47.5/39.5/36
Piping Connections - Liquid/Gas - o.d. - flare - in.	1/4 / 3/8	1/4 / 1/2	1/4 / 1/2	1/4 / 1/2	3/8 / 5/8
Drain connection o.d. - in.	1	1	1	1	1
Net/Shipping weights - lbs.	18 / 23	20 / 25	19 / 25	25 / 32	30 / 38

Indoor Unit Model No.	MWHB009S4		MWHB012S4	
Nominal Size - Tons	0.75		1	
Power Supply - 60 Hz - 1 phase	115V	208/230V	115V	208/230V
Rated load amps	6.3	3.11	10.13	4.9
Output (W)	20	13	20	13
Room Temperature Range (°F) Cooling	60 - 90	60 - 90	60 - 90	60 - 90
Heating	32 - 86	32 - 86	32 - 86	32 - 86
Air Volume - cfm (High/Medium/Low)	239 / 170 / 137	246 / 176 / 141	300 / 241 / 176	291 / 197 / 156
Sound Data (dBA) - Low/Medium/High	37.5 / 28 / 20	37 / 28 / 20	41 / 35 / 26.5	41 / 35 / 24
Piping Connections - Liquid/Gas - o.d. - flare - in.	1/4 / 3/8	1/4 / 3/8	1/4 / 1/2	1/4 / 1/2
Drain connection o.d. - in.	1	1	1	1
Net/Shipping weights - lbs.	18 / 23	18 / 23	19 / 24	19 / 24

Indoor Unit Model No.		MWHB018S4	MWHB024S4
Nominal Size - Tons		1.5	2
Power Supply - 60 Hz - 1 phase		208/230V	208/230V
Rated load amps		7.5	11.2
Output (W)		30	58
Room Temperature Range (°F)	Cooling	60 - 90	60 - 90
	Heating	32 - 86	32 - 86
Air Volume - cfm (High/Medium/Low)		459 / 329 / 271	546 / 402 / 331
Sound Data (dBA) - Low/Medium/High		45 / 38 / 30	45 / 39 .5 / 36
Piping Connections - Liquid/Gas - o.d. - flare - in.		1/4 / 1/2	3/8 / 5/8
Drain connection o.d. - in.		1	1
Net/Shipping weights - lbs.		25 / 32	30 / 38

1.3. Indoor Unit Dimensions (All Models)

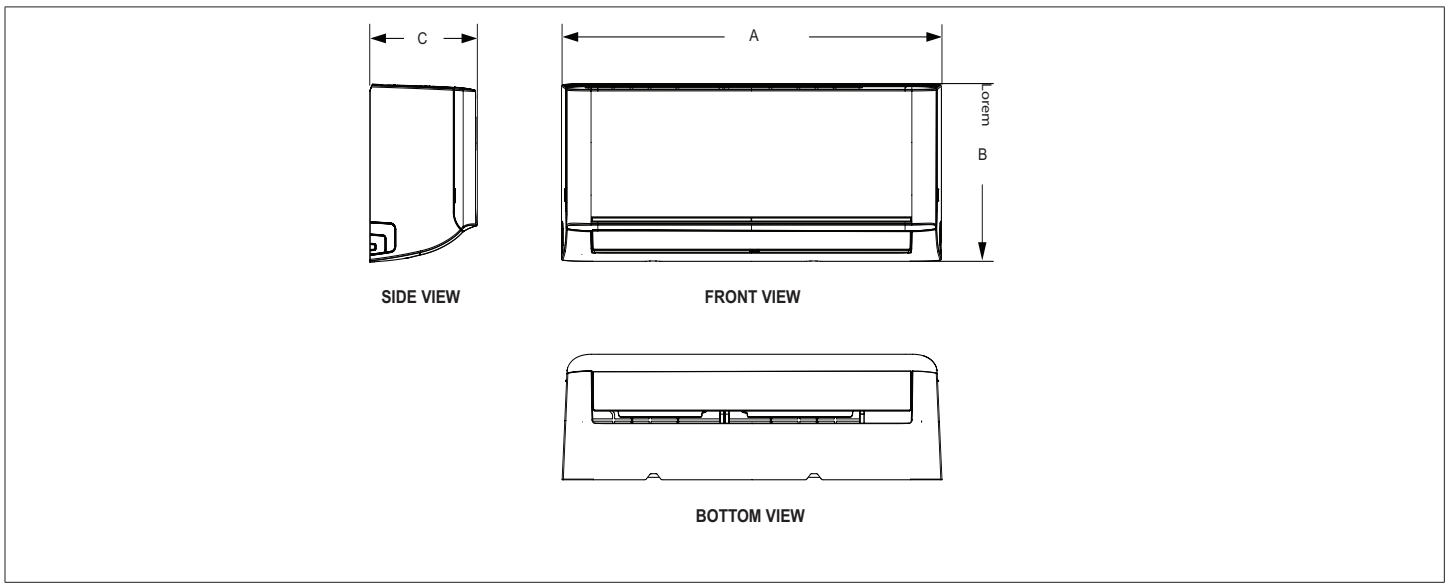
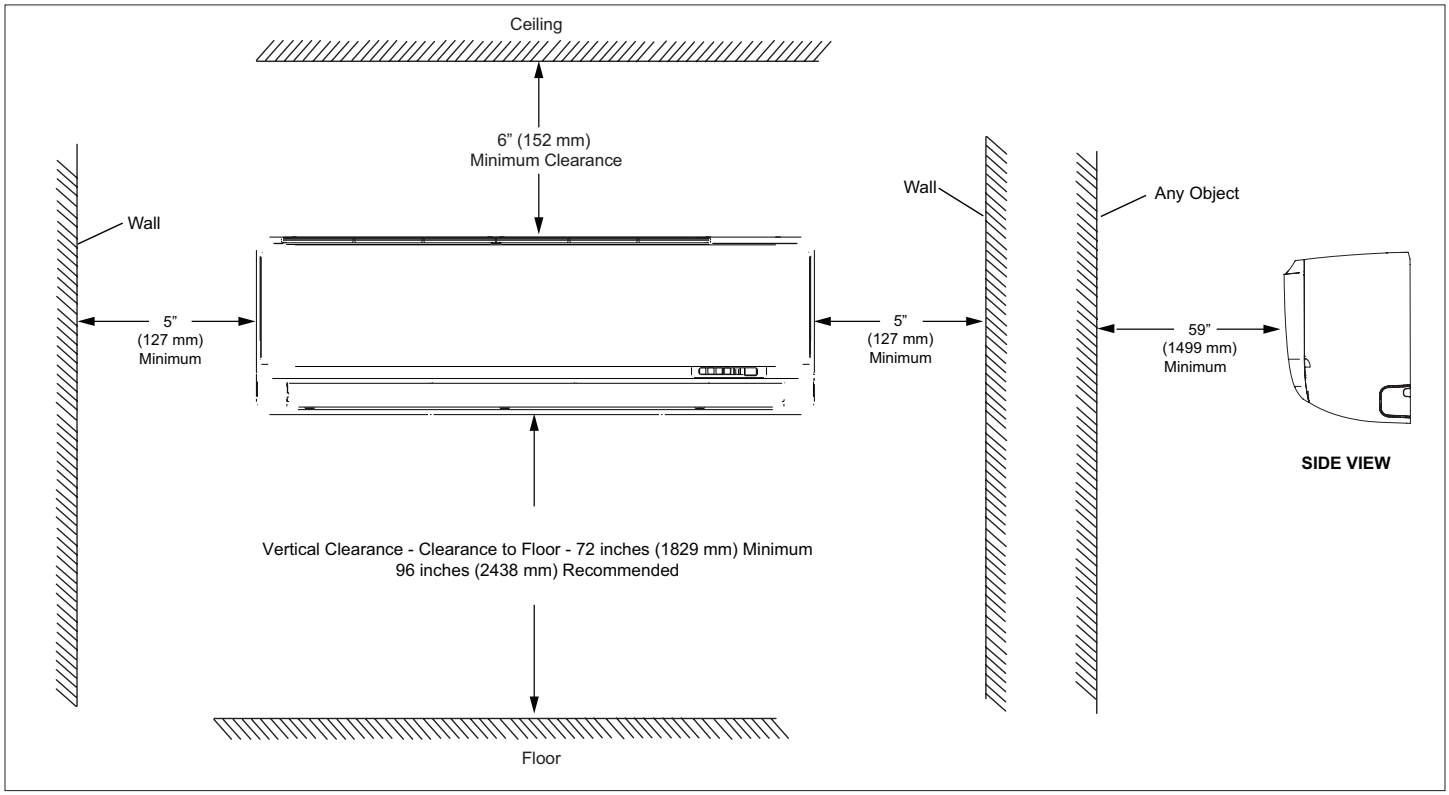


Figure 1. Indoor Unit Dimensions - Inches (mm)

Size	A		B		C	
	in.	mm	in.	mm	in.	mm
9K	27-3/4	730	11-1/2	292	8-1/8	207
12K	31-3/4	806	11-5/8	295	7-7/8	200
18K	38-1/4	972	12-3/4	324	9-1/8	232
24K	42-5/8	1083	13-1/4	337	9-3/8	238

1.4. Indoor Unit Clearances (All Models)



1.5. Indoor Unit Wall Mounts (All Models)

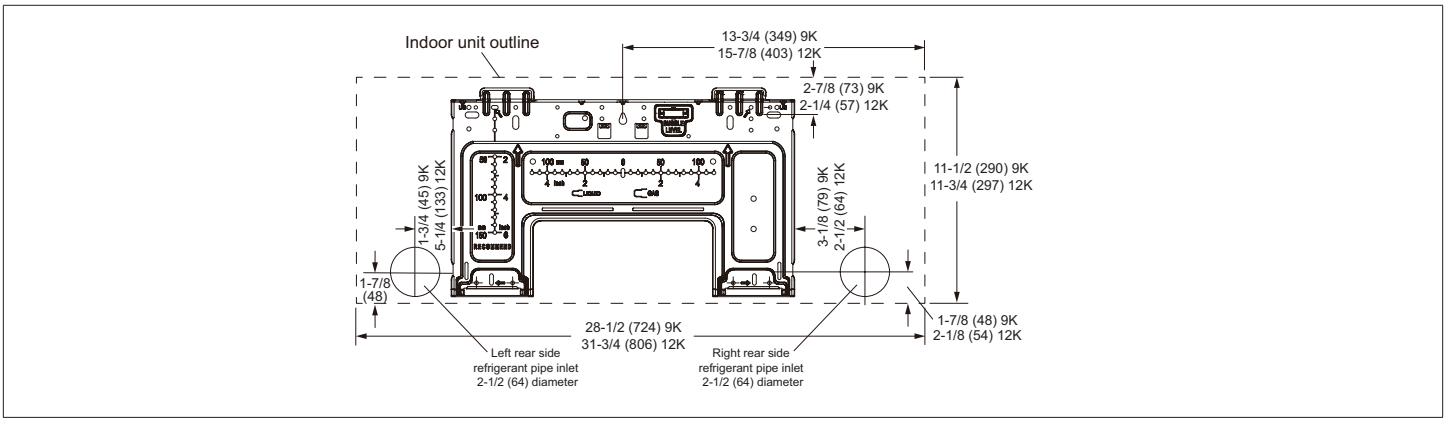


Figure 2. 9K and 12K Indoor Unit Wall Plate Dimensions - Inches (mm)

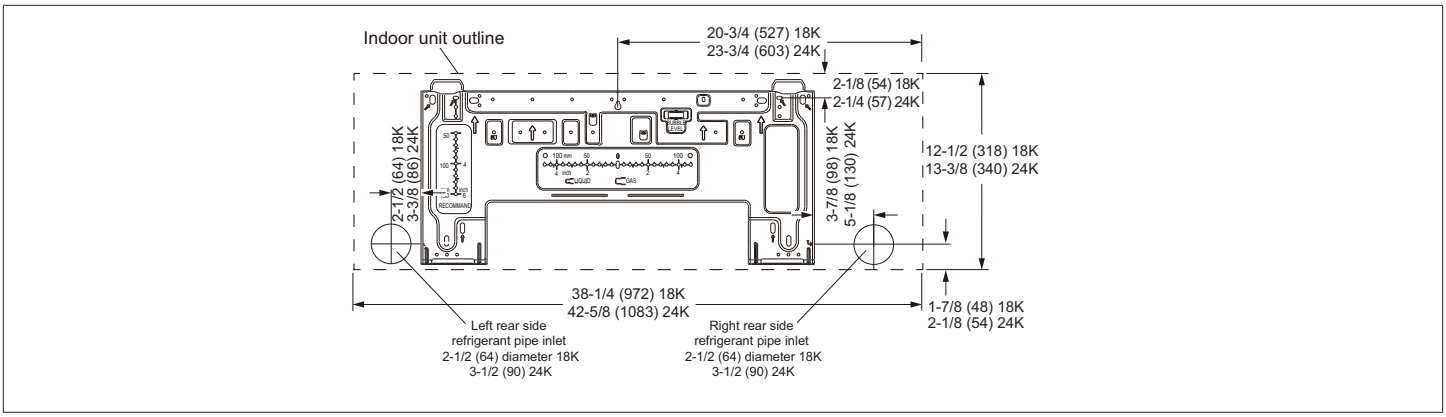


Figure 3. 18K - 24K Indoor Unit Wall Plate Dimensions - Inches (mm)

2. Indoor/Outdoor Matches

Indoor Unit Type	Outdoor Unit	Indoor Unit	Cooling Capacity	SEER	EER	Energy Star
Wall-Mounted Ductless	MCB009S4S-1P	MWCB009S4-1P	9,000	20.5	12.5	Yes
	MCB012S4S-1L	MWCB012S4-1L	11,500	21.0	11.9	No
	MCB012S4S-1P	MWCB012S4-1P	11,500	21.0	11.98	No
	MCB018S4S-1P	MWCB018S4-1P	17,500	21.0	11.26	No
	MCB024S4S-1P	MWCB024S4-1P	22,000	20.0	10.20	No

Ratings are AHRI certified to AHRI Standard 210/240 (with 25 ft. of connecting refrigerant lines); 95°F outdoor air temperature, 80°F db / 67°F wb entering evaporator air.

Indoor Unit Type	Outdoor Unit	Indoor Unit	Cooling Capacity	SEER	EER	Energy Start
Wall-Mounted Ductless	MHB009S4S-1L	MWHB009S4-1L	9,000	21.5	12.5	Yes
	MHB009S4S-1P	MWHB009S4-1P	9,000	21.5	12.6	Yes
	MHB012S4S-1L	MWHB012S4-1L	12,000	20.0	10.3	No
	MHB012S4S-1P	MWHB012S4-1P	12,000	20.5	10.8	No
	MHB018S4S-1P	MWHB018S4-1P	18,000	19.5	11.0	No
	MHB024S4S-1P	MWHB024S4-1P	24,000	18.5	9.50	No

Ratings are AHRI certified to AHRI Standard 210/240 with Addenda 1 and 2;
- Cooling Ratings - 80°F dry bulb/67°F wet bulb entering indoor coil air and 95°F wet bulb/75°F dry bulb outdoor air temperature.
- High Temperature Heating Ratings - 70°F dry bulb/60°F wet bulb entering indoor coil air and 47°F dry bulb/43°F wet bulb outdoor air temperature.
- Low Temperature Heating Ratings - 70°F dry bulb/60°F wet bulb entering indoor coil air and 17°F dry bulb/15°F wet bulb outdoor air temperature.

To convert HSPF from Region IV to Region V - Divide by 1.15.

3. Connection to Centralized Controller

3.1. Set Indoor Unit Address for Centralized Control (Used with VRF Only)

All indoor units connected to a centralized controller must have a unique address. Use the S1 dip switch and the S2 dial switch to set the address for each indoor unit. The table below shows how to set the unique addresses.

All indoor units are factory set to “0”. To change the address to “1”, move the dial switch to the 1 position, do not adjust the dip switches. To change the address to “35”, move dip switch 1 to the UP position and move the dial switch to the 3 position.

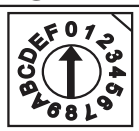
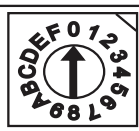
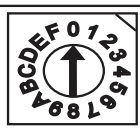
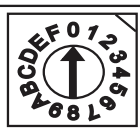
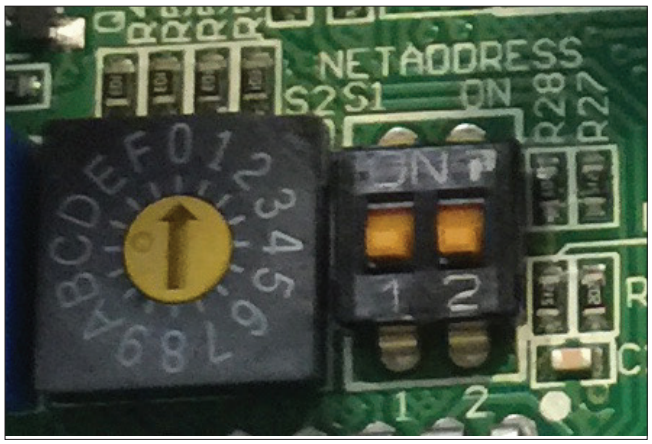
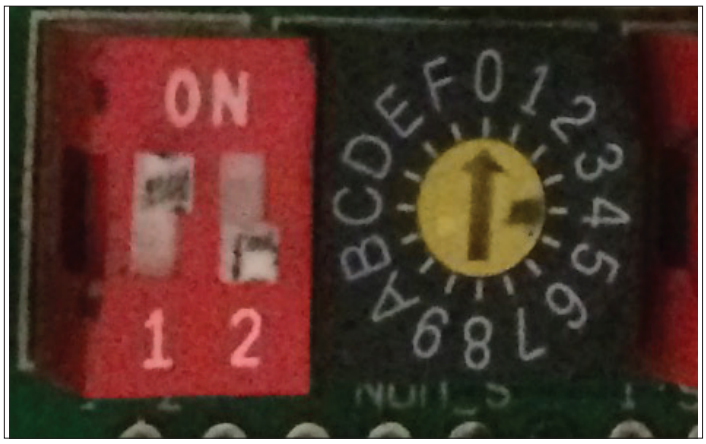
FOR SETTING ADDRESS				
S1+S2				
RANGE	0 ~ F	0 ~ F	0 ~ F	0 ~ F
ADDRESS	0 ~ 15	16 ~ 31	32 ~ 47	48 ~ 63
DIP SWITCH HANDLES	LEFT - DOWN RIGHT - DOWN	LEFT - DOWN RIGHT - UP	LEFT - UP RIGHT - DOWN	LEFT - UP RIGHT - UP
FACTORY SETTING	✓			

Figure 4. Dip Switches



Indoor Unit Address is 0
Both dip switch handles are DOWN, dial points to 0.



Indoor Unit Address is 32
Dip switch 1 is UP and dip switch 2 is DOWN, dial points to 0.

Switch location and color varies for each indoor unit. Two examples are shown above.

Figure 5. Dip Switch Settings

3.2. Indoor Unit Connection Points for Centralized Controller

Mini-split indoor units can be connected to a centralized controller (e.g. Lennox VRF Manager - LVM or Trane Tracer) or a BACnet or LonWorks gateway using the XYE terminals on the indoor unit main board.

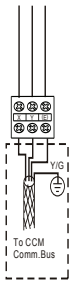


Figure 6. Indoor Unit Connection Points

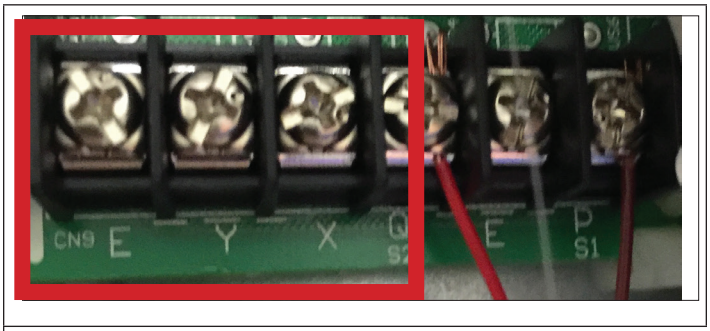
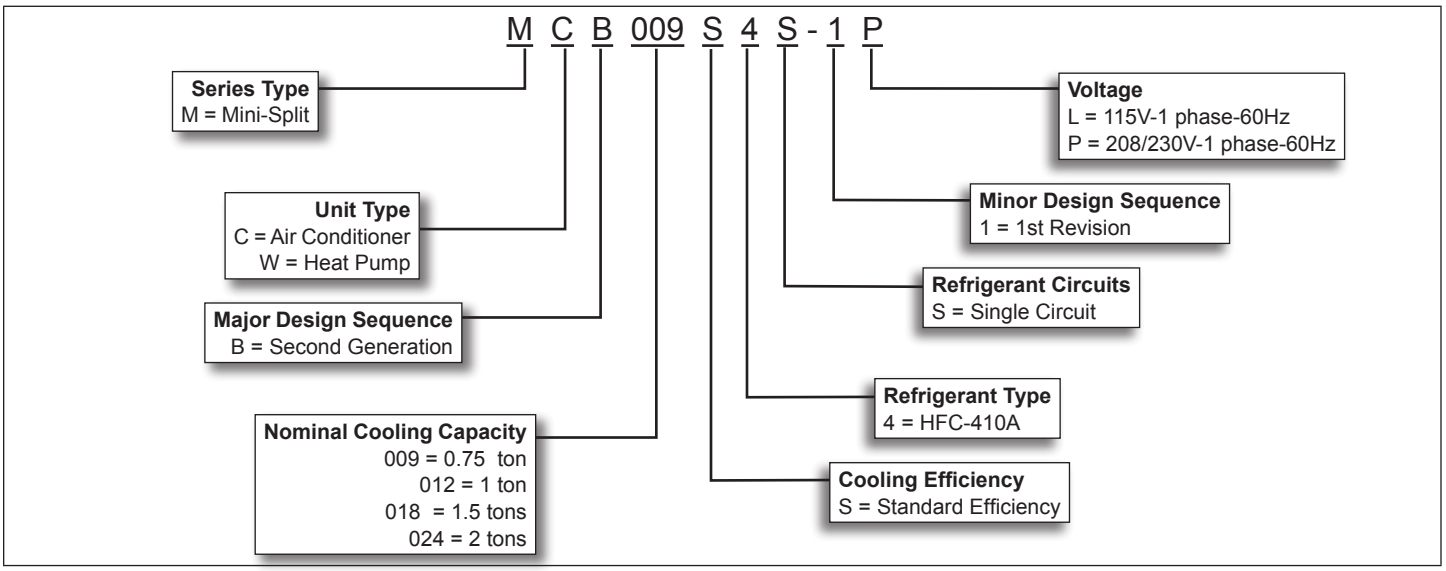


Figure 7. Typical Indoor Unit Connection Points

4. Outdoor Units

4.1. Model Number Identification



4.2. Specifications

Outdoor Unit Model No.		MCB009S4S	MCB012S4S	MCB018S4S	MCB024S4S
Nominal Size - Tons		0.75	1	1.5	2
Ambient Temperature Operating Range - °F		5 - 122	5 - 122	5 - 122	5 - 122
Energy Star					
Sound Data (dBA)		53.5	54 (115V) 54.5 (208/230V)	54.5	55.5
Refrigerant (R-410A)	Charge furnished	1 lb. 5 oz.	1 lb. 7 oz.	2 lbs. 0 oz.	2 lbs. 6 oz.
	Maximum line length with furnished charge - ft.	25	25	25	25
	Additional charge required per ft. - oz.	0.16	0.16	0.16	0.32
Compressor	No. and Type	(1) Rotary	(1) Rotary	(1) Rotary	(1) Rotary
	Refrigerant oil type	VG74	VG74	VG74	VG74
	Refrigerant oil charge - oz.	10.5	10.5	14.9	14.9
Connections - in.	Liquid/Gas pipe (flare)	1/4 / 3/8	1/4 / 1/2	1/4 / 1/2	3/8 / 5/8
	Maximum refrigerant pipe length - ft.	82	82	98	98
	Max. difference in level of indoor unit - ft.	33	33	66	66
Outdoor Fan	(No.) Diameter - in.	(1) 16-5/8	(1) 16-5/8	(1) 16-1/2	(1) 17
	Total air volume - cfm	1059	1059	1235	1253
	rpm	850/500	850/600	810/700/600	710/700/550
Outdoor Coil	Number of rows	1	1	2	2
	Fins per inch	21	21	21	21
	Fin type	Hydrophilic aluminum			
	Tube outside diameter - in.	3/16	3/16	3/16	3/16
	Tube type	Rifled copper tubing			
	Net face area - ft.²	3.63	3.73	4.17	4.78 + 4.00
Design Pressure	PSIG	550/340	550/340	550/340	550/340
Shipping Data	Net/Shipping weight (lbs.) (115V)	- - -	51 / 55	- - -	- - -
	(208/230V)	48 / 51	49 / 53	62 / 67	68/73

Outdoor Unit Model No.		MCB009S4S	MCB012S4S		MCB018S4S	MCB024S4S
ELECTRICAL DATA						
Electrical Characteristics - 60 Hz - 1 Phase		208/230V	115V	208/230V	208/230V	208/230V
[1] Maximum Overcurrent Protection (MOCP) amps		11	18	11	16	16
[2] Minimum circuit ampacity (MCA)		15	30	15	20	20
Compressor Rated load amps		15	30	15	20	20
Outdoor Fan Motor	Rated load amps	0.4	0.4	0.4	0.4	0.4
	Output - W	34	34	34	34	34

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

Outdoor Unit Model No.		MHB009S4S	MHB012S4S	MHB018S4S	MHB024S4S
Nominal Size - Tons		0.75	1	1.5	2
Ambient Temperature Operating Range - °F	Cooling	5 - 122	5 - 122	5 - 122	5 - 122
	Heating	5 - 86	5 - 86	5 - 86	5 - 86
Energy Star					
Sound Data (dBA)		55 (115V) 54.5 (208/230V)	53.5	57	60
Refrigerant (R-410A)	Charge furnished	1 lb. 9 oz.	1 lb. 13 oz.	2 lbs. 16 oz.	3 lbs. 15 oz.
Maximum line length with furnished charge - ft.		25	25	25	25
Additional charge required per ft. - oz.		0.16	0.16	0.16	0.32
Compressor	No. and Type	(1) Rotary	(1) Rotary	(1) Rotary	(1) Rotary
	Refrigerant oil type	Ester Oil VG74	Ester Oil VG74	Ester Oil VG74	Ester Oil VG74
Refrigerant oil charge - oz.		10.5	10.1	14.9	21.0
Connections - in.	Liquid/Gas pipe (flare)	1/4 - 3/8	1/4 - 1/2	1/4 - 1/2	3/8 - 5/8
Maximum refrigerant pipe length - ft.		82	82	98	164
Max. difference in level of indoor unit - ft.		33	33	66	82
Outdoor Fan	(No.) Diameter - in.	(1) 16-1/2	(1) 16-1/2	(1) 17	(1) 21
	Total air volume - cfm	1294	1235	1235	1765
	rpm	850 / 650	(115V) (208/230V)	800 / 750 / 650	800 / 750 / 650
Outdoor Coil	Number of rows	1	1	2	2
	Fins per inch	21	21	21	21
	Fin type	Hydrophilic aluminum			
	Tube outside diameter - in.	1/4	1/4	1/4	1/4
	Tube type	Rifled copper tubing			
	Net face area - ft.²	4.01	4.02	4.66	5.90
Design Pressure	PSIG	550 / 340	550 / 340	550 / 340	550 / 340
Shipping Data	Net/Shipping weight (lbs.) (115V)	58 / 64	63 / 68	- - -	- - -
	(208/230V)	55 / 61	60 / 65	74 / 80	98 / 105

ELECTRICAL DATA							
Electrical Characteristics - 60 Hz - 1 Phase		115V	208/230V	115V	208/230V	208/230V	208/230V
[1] Maximum Overcurrent Protection (amps)		30	15	25	15	20	30
[2] Minimum circuit ampacity		20	12	18.5	15	15	19
Compressor Rated load amps							
Outdoor Fan Motor	Rated load amps						
	Output - W	34	34	34	34	34	80

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

4.3. MCB Cooling Capacity

4.3.1. - 009 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	8.54	5.93	8.97	6.18	9.54	6.54	9.99	6.81
17	8.89	6.30	9.30	6.56	9.77	6.86	10.32	7.20
25	8.90	6.42	9.46	6.79	10.02	7.16	10.57	7.50
35	9.36	6.70	9.78	6.96	10.41	7.37	10.86	7.65
47	9.51	6.87	10.01	7.19	10.62	7.58	11.12	7.90
55	9.90	7.76	10.34	8.05	10.78	8.35	11.23	8.64
65	9.74	7.58	10.19	7.89	10.77	8.29	11.34	8.68
75	9.97	7.82	10.45	8.15	10.89	8.45	11.46	8.83
85	8.90	6.89	9.31	7.17	9.91	7.58	10.43	7.94
95	8.03	6.65	8.47	6.97	8.86	7.24	9.28	7.54
105	7.42	6.35	7.88	6.71	8.35	7.07	8.88	7.48
110	7.12	6.49	7.54	6.84	7.96	7.17	8.47	7.59
115	6.69	6.29	6.97	6.53	7.39	6.89	7.82	7.24
122	6.17	6.17	6.47	6.45	6.76	6.72	7.06	6.98

4.3.2. - 012 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	10.06	7.01	10.49	7.27	11.03	7.61	11.60	7.96
17	10.15	7.22	10.71	7.57	11.31	7.95	11.94	8.34
25	10.51	7.74	11.03	8.07	11.49	8.35	12.08	8.74
35	10.50	7.87	11.01	8.20	11.55	8.56	12.23	9.00
47	10.51	7.93	10.96	8.22	11.64	8.69	12.37	9.19
55	10.88	8.34	11.39	8.70	12.00	9.11	12.50	9.44
65	10.76	8.30	11.38	8.73	11.96	9.12	12.63	9.58
75	11.11	8.70	11.59	9.03	12.15	9.42	12.75	9.83
85	10.65	8.64	11.27	9.09	11.95	9.59	12.66	10.10
95	10.69	8.79	11.17	9.14	11.69	9.53	12.41	10.07
105	9.97	8.60	10.45	8.97	10.89	9.29	11.47	9.73
110	8.90	7.81	9.29	8.11	9.85	8.56	10.43	9.02
115	7.74	7.29	8.16	7.65	8.64	8.05	9.17	8.50
122	6.61	6.56	7.03	6.95	7.46	7.34	7.88	7.73

4.3.3. - 012 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	10.30	7.18	10.73	7.44	11.29	7.79	11.86	8.14
17	10.44	7.36	10.94	7.67	11.56	8.06	12.13	8.42
25	10.56	7.73	11.22	8.17	11.87	8.59	12.47	8.98
35	10.95	7.87	11.63	8.32	12.13	8.63	12.78	9.05
47	11.10	8.22	11.62	8.56	12.27	8.99	12.90	9.40
55	11.20	8.64	11.87	9.11	12.54	9.58	13.09	9.95
65	11.42	8.76	11.95	9.11	12.48	9.46	13.28	10.01
75	11.51	9.20	12.14	9.66	12.81	10.13	13.48	10.61
85	11.02	8.74	11.58	9.12	12.06	9.45	12.82	10.00
95	10.41	8.53	10.85	8.85	11.34	9.20	12.02	9.70
105	9.71	8.40	10.27	8.84	10.76	9.20	11.31	9.61
110	8.93	7.93	9.44	8.34	10.01	8.80	10.65	9.31
115	8.51	7.96	8.88	8.26	9.31	8.60	9.82	9.03
122	7.41	7.35	7.77	7.68	8.23	8.11	8.76	8.58

4.3.4. - 018 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	16.28	11.06	17.15	11.60	18.03	12.13	19.14	12.81
17	16.50	11.61	17.54	12.26	18.56	12.90	19.47	13.46
25	17.34	12.38	18.38	13.07	19.25	13.60	20.48	14.40
35	18.72	14.06	19.65	14.68	20.46	15.22	21.41	15.84
47	16.29	12.42	17.13	12.98	17.91	13.51	18.90	14.17
55	16.05	12.11	16.76	12.56	17.77	13.24	18.84	13.96
65	15.99	12.25	16.98	12.92	17.98	13.61	18.79	14.15
75	16.27	12.62	17.22	13.27	17.97	13.78	18.74	14.30
85	15.90	12.73	16.73	13.33	17.43	13.81	18.31	14.45
95	15.28	12.44	16.07	13.01	16.81	13.52	17.88	14.31
105	14.08	11.94	14.71	12.41	15.55	13.04	16.37	13.65
110	12.71	11.61	13.26	12.07	13.89	12.57	14.76	13.28
115	11.15	10.19	11.64	10.58	12.35	11.18	12.87	11.59
122	9.33	9.34	9.86	9.83	10.32	10.25	10.96	10.83

4.3.5. - 024 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	19.87	14.01	20.87	14.63	21.90	15.27	22.91	15.90
17	20.41	14.35	21.33	14.91	22.62	15.73	23.89	16.53
25	20.79	14.71	21.93	15.41	22.98	16.07	24.45	17.02
35	21.88	15.85	22.82	16.43	23.92	17.13	24.99	17.79
47	20.96	15.18	22.14	15.93	23.45	16.80	24.87	17.71
55	21.22	16.15	22.29	16.88	23.69	17.84	24.67	18.48
65	20.93	15.75	21.81	16.31	23.08	17.18	24.50	18.15
75	20.81	16.09	21.95	16.87	23.11	17.67	24.32	18.48
85	20.05	15.53	21.02	16.18	22.15	16.95	23.44	17.86
95	19.73	15.81	20.57	16.39	21.50	17.04	22.68	17.87
105	17.79	15.23	18.61	15.85	19.72	16.70	20.86	17.59
110	16.07	14.43	16.86	15.05	17.88	15.87	18.78	16.58
115	14.16	13.53	14.79	14.08	15.60	14.75	16.34	15.36
122	11.75	11.76	12.47	12.43	13.08	12.99	13.89	13.72

4.4. MHB Cooling Capacity

4.4.1. - 009 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	8.92	6.28	9.46	6.62	9.97	6.94	10.47	7.26
17	9.50	6.86	9.97	7.16	10.54	7.53	10.98	7.79
25	9.76	6.91	10.29	7.24	10.72	7.50	11.28	7.85
35	10.02	7.14	10.66	7.56	11.12	7.84	11.60	8.14
47	9.73	7.28	10.20	7.59	10.78	7.98	11.39	8.38
55	9.80	7.31	10.22	7.58	10.67	7.87	11.16	8.19
65	9.17	7.25	9.68	7.62	10.30	8.06	10.93	8.51
75	9.10	7.10	9.65	7.49	10.09	7.79	10.70	8.22
85	8.80	6.96	9.30	7.31	9.74	7.61	10.19	7.92
95	8.55	7.12	9.00	7.46	9.44	7.78	9.90	8.12
105	7.93	6.84	8.42	7.22	8.91	7.60	9.47	8.04
110	7.81	6.93	8.18	7.23	8.65	7.61	9.11	7.97
115	7.48	6.99	7.82	7.26	8.21	7.57	8.58	7.87
122	6.86	6.84	7.28	7.22	7.61	7.52	8.00	7.87

4.4.2. - 009 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	9.42	6.54	9.89	6.84	10.45	7.18	10.95	7.49
17	9.26	6.53	9.78	6.86	10.33	7.21	10.85	7.53
25	9.98	7.24	10.46	7.54	10.91	7.82	11.37	8.09
35	10.30	7.75	10.77	8.06	11.35	8.45	11.84	8.76
47	9.92	7.40	10.53	7.81	11.03	8.13	11.66	8.55
55	9.80	7.31	10.42	7.74	11.04	8.16	11.55	8.49
65	9.63	7.53	10.25	7.97	10.84	8.39	11.45	8.80
75	9.64	7.66	10.21	8.06	10.86	8.53	11.34	8.87
85	9.31	7.33	9.71	7.59	10.12	7.87	10.66	8.24
95	8.62	6.92	9.17	7.32	9.56	7.59	10.14	8.00
105	8.33	6.93	8.76	7.26	9.29	7.65	9.71	7.94
110	8.04	7.34	8.40	7.62	8.86	7.99	9.33	8.36
115	7.69	7.10	8.06	7.40	8.46	7.73	8.87	8.07
122	7.28	7.26	7.67	7.61	7.99	7.90	8.34	8.21

4.4.3. - 012 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	11.06	7.60	11.52	7.88	12.00	8.16	12.77	8.64
17	11.13	7.91	11.67	8.26	12.41	8.74	13.16	9.21
25	11.35	8.08	11.92	8.44	12.59	8.86	13.32	9.32
35	11.43	8.33	12.02	8.71	12.71	9.16	13.45	9.64
47	11.14	8.16	11.62	8.45	12.17	8.81	12.90	9.28
55	11.02	8.40	11.63	8.82	12.31	9.29	12.92	9.70
65	11.04	8.37	11.65	8.79	12.34	9.26	12.93	9.65
75	11.02	8.63	11.65	9.08	12.19	9.46	12.94	9.98
85	11.01	8.65	11.49	8.97	12.06	9.36	12.79	9.87
95	11.01	8.95	11.49	9.29	12.06	9.69	12.57	10.05
105	10.47	8.76	11.04	9.19	11.53	9.54	12.05	9.92
110	9.79	8.97	10.40	9.46	11.05	9.99	11.57	10.41
115	9.54	9.06	10.11	9.54	10.54	9.89	10.99	10.25
122	8.77	8.74	9.28	9.21	9.69	9.58	10.11	9.94

4.4.4. - 012 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	10.60	7.36	11.12	7.68	11.81	8.12	12.38	8.46
17	10.94	7.97	11.45	8.29	12.14	8.75	12.67	9.09
25	10.97	7.87	11.51	8.21	12.20	8.66	12.90	9.11
35	11.25	8.46	11.96	8.94	12.52	9.31	13.13	9.70
47	11.03	8.07	11.72	8.53	12.47	9.02	13.22	9.51
55	11.34	8.61	11.91	9.01	12.45	9.37	13.17	9.85
65	11.12	8.62	11.72	9.04	12.37	9.49	13.12	10.01
75	11.32	8.85	11.84	9.20	12.51	9.67	13.07	10.04
85	11.36	8.83	11.95	9.23	12.49	9.59	13.22	10.09
95	11.35	9.35	11.96	9.80	12.63	10.29	13.40	10.85
105	11.10	9.56	11.71	10.02	12.34	10.51	12.89	10.92
110	10.85	9.92	11.30	10.28	11.79	10.67	12.32	11.09
115	9.98	9.28	10.58	9.77	11.09	10.19	11.66	10.66
122	9.38	9.32	9.81	9.71	10.34	10.20	10.91	10.70

4.4.5. - 018 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	14.73	10.34	15.39	10.74	16.20	11.25	17.20	11.87
17	14.89	10.53	15.60	10.96	16.56	11.58	17.36	12.08
25	14.97	10.82	15.76	11.31	16.67	11.91	17.72	12.60
35	15.90	11.36	16.61	11.81	17.34	12.26	18.14	12.77
47	16.09	12.22	16.90	12.77	17.63	13.25	18.75	14.01
55	16.37	12.77	17.05	13.23	17.97	13.88	19.09	14.68
65	16.43	12.98	17.41	13.66	18.48	14.43	19.45	15.10
75	16.97	13.08	17.77	13.62	18.83	14.34	19.80	14.98
85	16.82	13.69	17.88	14.47	18.90	15.20	19.73	15.78
95	16.48	13.55	17.45	14.28	18.47	15.04	19.30	15.63
105	16.02	13.31	16.77	13.86	17.60	14.47	18.60	15.20
110	15.19	13.58	16.16	14.37	16.92	14.96	17.76	15.62
115	14.42	13.33	15.23	14.00	15.93	14.56	16.59	15.10
122	13.11	13.07	13.87	13.76	14.69	14.53	15.33	15.10

4.4.6. - 024 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
5	20.55	14.54	21.75	15.30	23.04	16.12	24.28	16.87
17	21.20	15.08	22.15	15.68	23.15	16.29	24.50	17.15
25	21.47	15.78	22.84	16.68	23.89	17.37	25.07	18.13
35	22.71	16.55	23.66	17.15	24.64	17.78	25.72	18.44
47	21.85	15.79	23.13	16.61	24.37	17.39	25.57	18.16
55	22.22	17.04	23.52	17.96	24.50	18.60	26.00	19.63
65	22.10	16.71	23.51	17.69	24.90	18.65	26.46	19.69
75	22.93	18.26	24.24	19.20	25.38	20.00	26.89	21.08
85	21.85	17.23	23.02	18.07	24.41	19.07	25.94	20.13
95	20.88	16.61	22.05	17.43	23.33	18.36	24.61	19.25
105	20.21	16.92	21.34	17.77	22.33	18.47	23.73	19.53
110	19.38	17.26	20.49	18.16	21.61	19.04	22.89	20.08
115	18.64	17.64	19.58	18.42	20.39	19.10	21.63	20.16
122	17.33	17.19	18.28	18.06	19.13	18.81	20.22	19.81

4.5. MHB Heating Capacity

4.5.1. - 009 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
5	6.07	5.87	5.68	5.43
10	6.92	6.73	6.53	6.25
17	7.92	7.65	7.42	7.16
20	8.22	7.98	7.74	7.40
25	8.53	8.25	8.04	7.71
32	8.77	8.54	8.33	7.96
35	9.12	8.90	8.66	8.28
40	10.15	9.90	9.66	9.26
45	11.29	10.95	10.65	10.28
50	11.83	11.47	11.16	10.73
57	12.40	12.01	11.61	11.19

4.5.2. - 009 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
5	6.43	6.21	6.00	5.74
10	7.20	7.02	6.79	6.52
17	8.14	7.92	7.71	7.43
20	8.67	8.39	8.19	7.89
25	9.26	8.98	8.70	8.32
32	9.74	9.43	9.17	8.85
35	10.26	9.94	9.66	9.22
40	10.88	10.57	10.22	9.84
45	11.37	11.06	10.75	10.26
50	11.92	11.53	11.18	10.69
57	12.38	12.07	11.72	11.29

4.5.3. - 012 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
5	7.49	7.25	7.01	6.71
10	7.94	7.74	7.53	7.27
17	8.53	8.28	8.06	7.70
20	9.31	9.07	8.76	8.46
25	10.12	9.82	9.51	9.09
32	10.85	10.52	10.21	9.76
35	11.67	11.34	10.99	10.55
40	12.66	12.31	11.94	11.41
45	13.61	13.20	12.88	12.30
50	14.26	13.83	13.45	12.93
57	14.91	14.48	14.04	13.50

4.5.4. - 012 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
5	8.46	8.17	7.94	7.62
10	9.10	8.83	8.55	8.21
17	9.65	9.33	9.07	8.70
20	10.10	9.83	9.56	9.14
25	10.65	10.33	10.05	9.70
32	11.17	10.83	10.53	10.05
35	11.74	11.35	10.99	10.53
40	13.36	12.95	12.53	12.09
45	14.77	14.31	13.92	13.36
50	15.46	15.05	14.59	13.95
57	16.14	15.66	15.17	14.62

4.5.5. - 018 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
5	11.39	11.03	10.76	10.37
10	12.30	12.00	11.71	11.24
17	13.38	13.02	12.60	12.12
20	14.42	14.04	13.62	13.04
25	15.57	15.04	14.60	14.08
32	16.54	16.10	15.59	14.95
35	17.66	17.08	16.67	15.97
40	18.89	18.28	17.72	16.92
45	19.69	19.11	18.59	17.81
50	20.44	19.79	19.14	18.41
57	20.83	20.26	19.71	18.86

4.5.6. - 024 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
5	16.10	15.57	15.09	14.50
10	17.62	17.11	16.66	15.93
17	19.25	18.74	18.14	17.40
20	20.20	19.58	19.02	18.34
25	21.20	20.57	19.87	19.00
32	21.99	21.24	20.73	19.88
35	22.71	22.11	21.53	20.56
40	26.02	25.17	24.32	23.25
45	28.31	27.52	26.69	25.76
50	29.03	28.27	27.44	26.34
57	29.90	29.11	28.29	27.16

4.6. Outdoor Unit Dimensions (MCB and MHB)

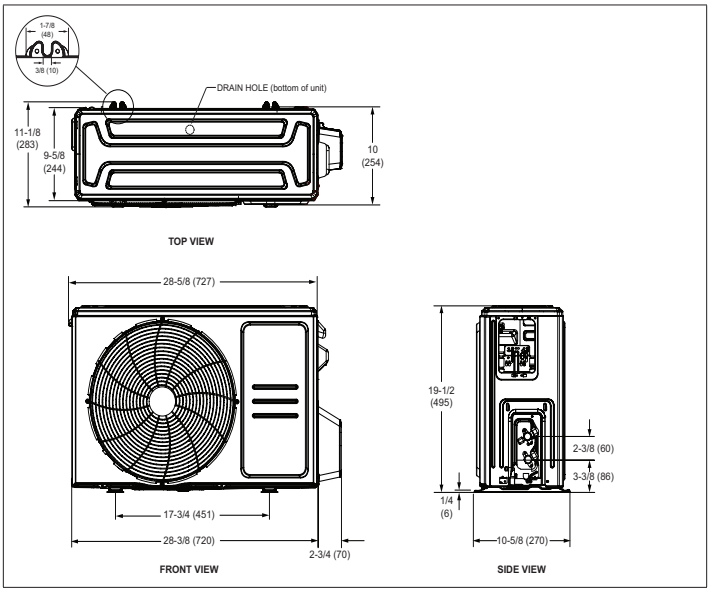


Figure 8. 09 and 12K Outdoor Unit Dimensions - Inches (mm)

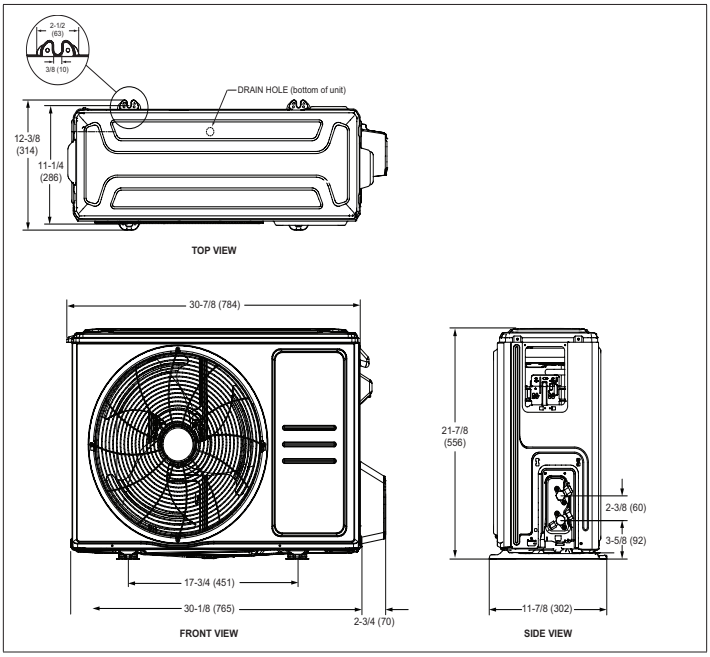


Figure 9. 18K Outdoor Unit Dimensions - Inches (mm)

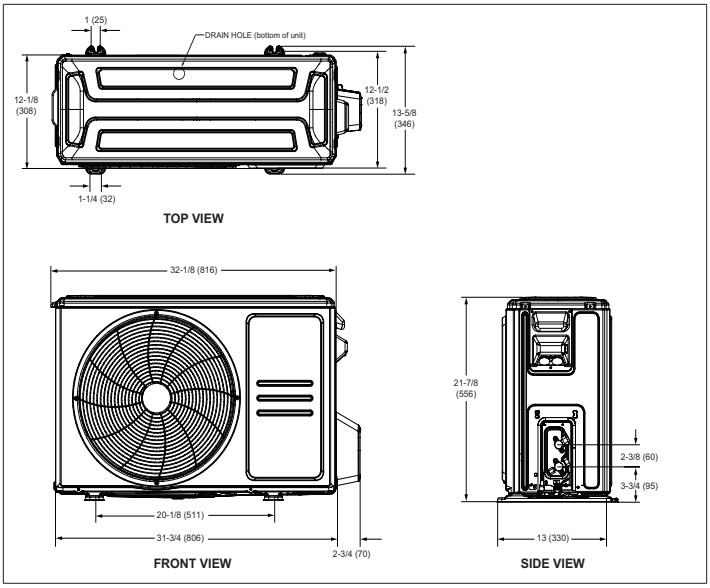


Figure 10. 124K Outdoor Unit Dimensions - Inches (mm)

4.7. Outdoor Unit Clearances

4.7.1. Single Units

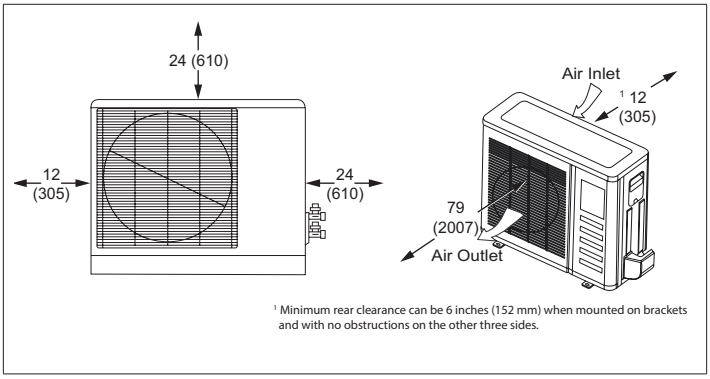
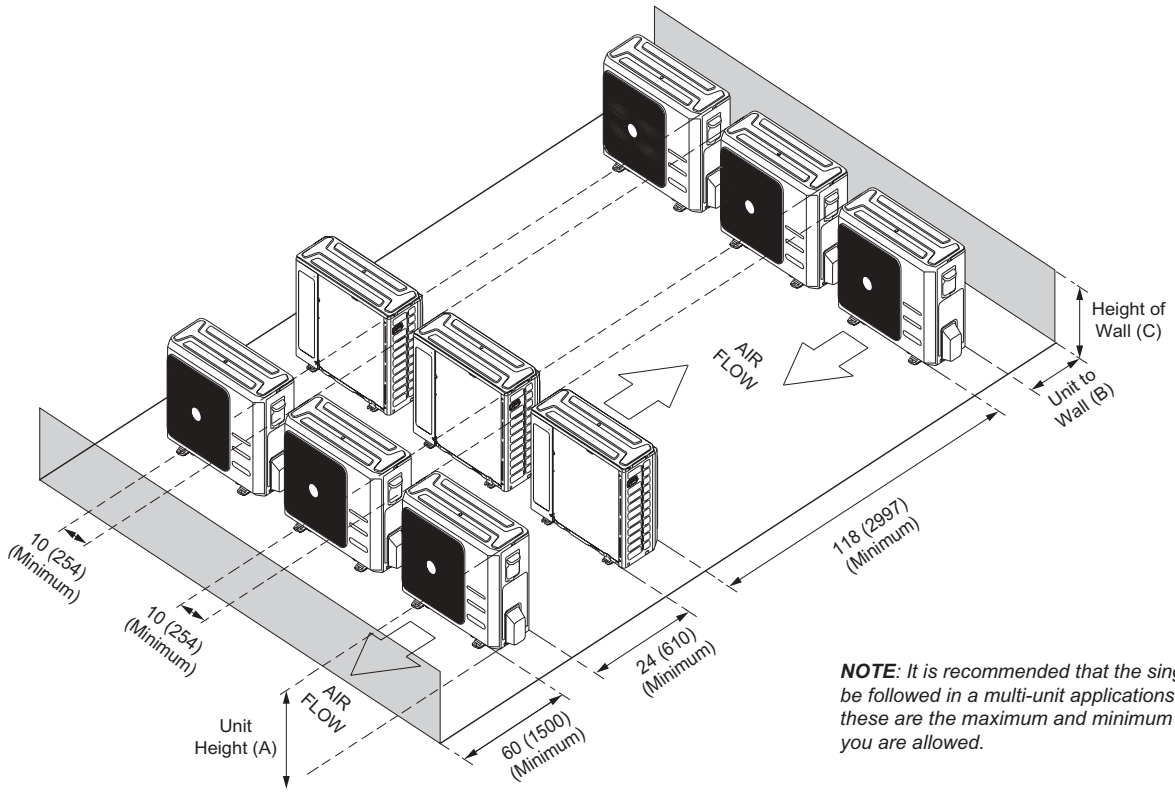


Figure 11. Single Outdoor Unit Clearances - Inches (mm)

4.7.2. Multiple Units



***NOTE**: It is recommended that the single clearance be followed in a multi-unit applications. If not then these are the maximum and minimum clearances you are allowed.*

CLEARANCE NOTES FOR MULTIPLE UNITS:

If the height of the wall (C) is less than or equal to the height of the smallest unit (A), the distance from the unit to the wall (B) must be a minimum of 10 inches (254 mm).

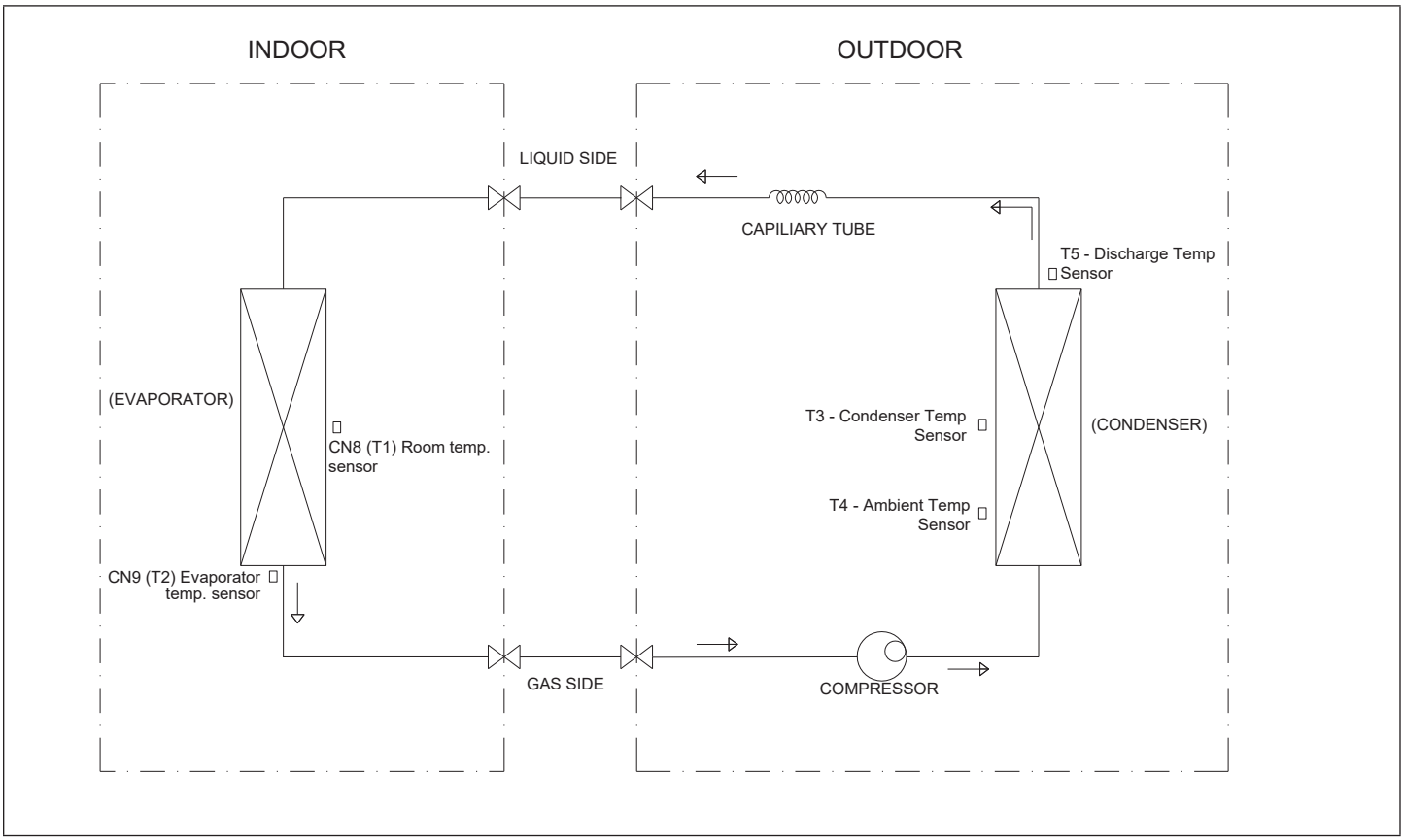
If 1/2 the height of the unit (A) is less than the height of the wall (C), the distance from the unit to the wall (B) must be a minimum of 12 inches (305 mm).

If the height of the wall (C) is greater than the height of the unit (A), the distance from the unit to the wall (B) must be a minimum of 20 inches (508 mm).

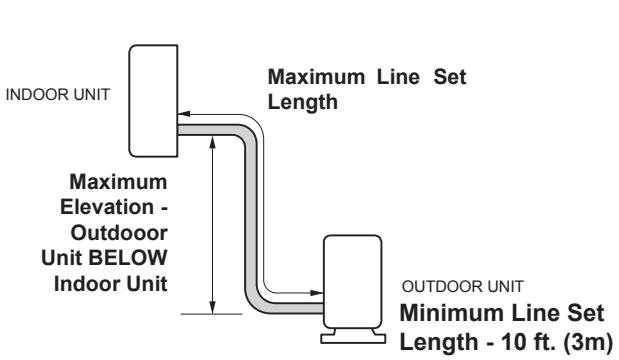
Figure 12. Multiple Outdoor Unit Clearances - Inches (mm)

5. Refrigeration Pipe Work

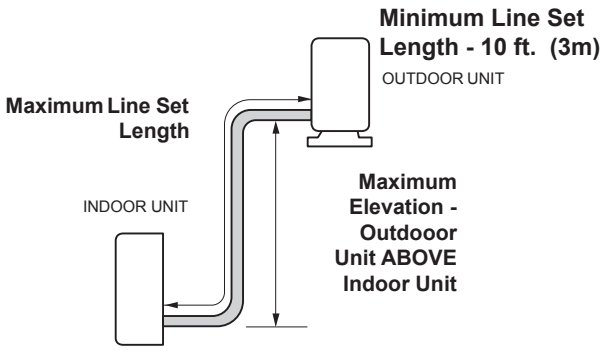
5.1. Single-Zone Refrigerant Cycle Diagram



5.2. Single-Zone Piping Limitations



Outside Unit BELOW Indoor Unit



Outside Unit ABOVE Indoor Unit

IMPORTANT

Do not allow for excess length of line sets to be left rolled up as part of the required distance, or in general. This will also cause additional performance issues.

5.3. Add Refrigerant after Long-Term System Operation

- Connect the charge hose to the three-way service port and open the two-way and three-way valve.
- Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R-410A, place the cylinder bottom-up to ensure liquid charge.
- Purge the air from the charge hose.
- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
- Place the charging cylinder onto the electronic scale and record the weight.
- Turn on the air conditioner in cooling mode.
- Open the valves (Low side)on the charge set and charge the system with liquid refrigerant.
- When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the three-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.
- Mount the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N.m(13.27 ft·lbs).
- Be sure to check for gas leaks.

5.4. Servicing Indoor Unit Refrigeration Circuit

5.4.1. Collecting Refrigerant into Outdoor Unit

- Confirm that both the two-way and three-way valves are set to the opened position
- Remove the valve stem caps and confirm that the valve stems are in the opened position.
- Be sure to use a hexagonal wrench to operate the valve stems.
- Connect the charge hose with the push pin of handle lo to the three-way valves gas service port.
- Air purging of the charge hose - Open the handle Lo valve of the manifold valve slightly to purge air from the charge hose for five seconds and then close it quickly.
- Set the two-way valve to the close position.
- Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa (14 psi).
- Set the three-way valve to the closed position immediately
- Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa (43 - 72 psi).
- Disconnect the charge set, and tighten the two-way and three-way valve's stem nuts.
- Use a torque wrench to tighten the three-way valves service port cap to a torque of 18N.m.
- Be sure to check for gas leakage.

5.4.2. Air Purging with Vacuum Pump

- Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the two-way and three-way valves are set to the closed position.
- Connect the charge hose with the push pin of handle lo to the three-way valves gas service port.
- Connect the charge hose of handle hi connection to the vacuum pump.
- Fully open the handle Lo of the manifold valve.
- Operate the vacuum pump to evacuate.
- Make evacuation for 30 minutes and check whether the compound meter indicates -0.1Mpa (500 microns). If the meter does not indicate - 0.1Mpa (500 microbars) after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa (500 microbars) after pumping 50 minutes, please check if there are some leakage points.
- Fully close the handle Lo valve of the manifold valve and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately five minutes after turning off the vacuum pump).
- Turn the flare nut of the three-way valves about 45° counterclockwise for six or seven seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the three-way valve.
- Fully open the two-way valve and three-way valve and securely tighten the cap of the three-way

5.5. Evacuation after Servicing the Outdoor Unit Refrigeration Circuit

5.5.1. Evacuation of the Complete Refrigeration Circuit (Indoor and Outdoor Units)

- Confirm that both the two-way and three-way valves are set to the opened position.
- Connect the vacuum pump to three-way valve's service port.
- Evacuation for approximately one hour. Confirm that the compound meter indicates -0.1Mpa (500 Microns / 29.9 in. hg).
- Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- Disconnect the charge hose from the vacuum pump.

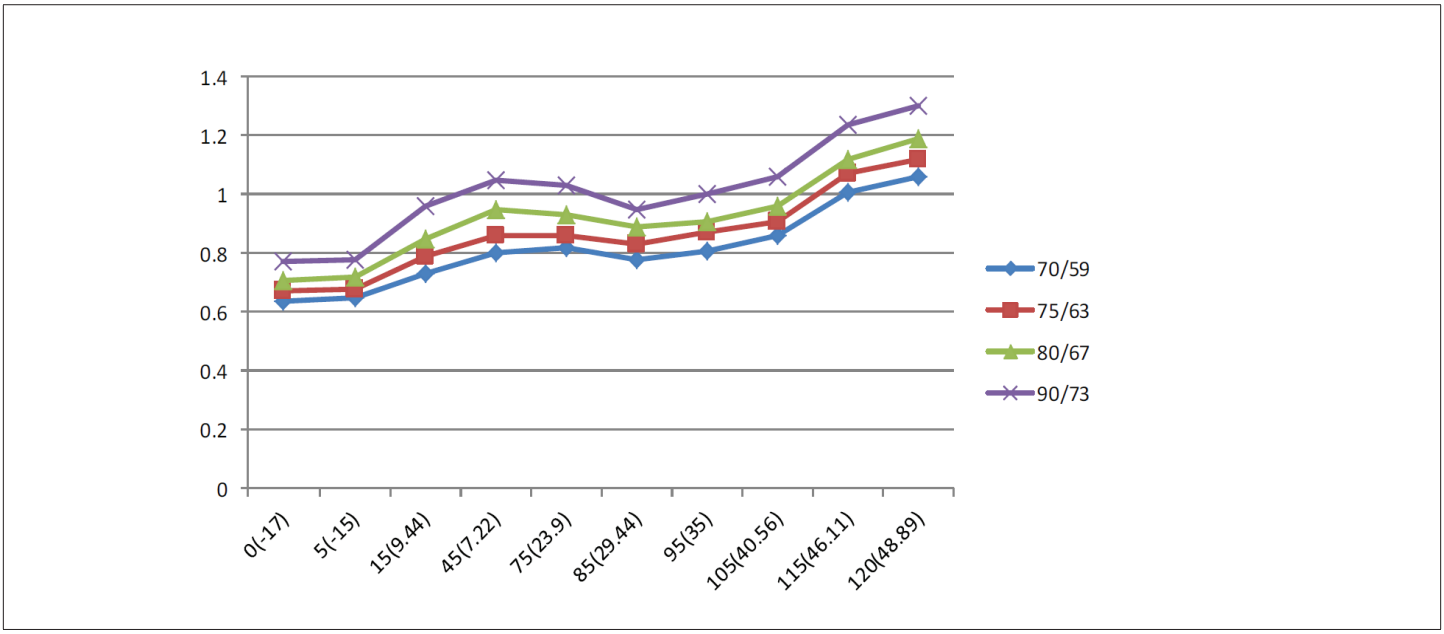
5.5.2. Refrigerant Charging

- Connect the charge hose to the charging cylinder, open the two-way valve and the three-way valve.
- Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R-410A, make the cylinder bottom up to ensure liquid charge.
- Purge the air from the charge hose
- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
- Put the charging cylinder onto the electronic scale and record the weight.
- Open the valves (Low side) on the charge set and charge the system with liquid refrigerant. If the system cannot be charge with the specified amount of refrigerant, or can be charged with a little at a time (approximately 150g each time) , operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.
- When the electronic scale displays the proper weight, disconnect the charge hose from the 3- way valve's service port immediately
- If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.
- Mounted the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N·m (13.27 ft·lbs).
- Always leak check after servicing the refrigerant system.
- There are one low-pressure centralized valve and one high-pressure centralized valve, it will be more time saving when vacuum and recycle refrigerant. But refer to the previous instruction when vacuum and recycle refrigerant.

5.6. Cooling Chart

Table 1. Cooling - Fahrenheit (Celsius)

°F(°C)	ODU(DB) IDU(DB/WB)	0 (-17)	5 (-15)	15 (9.44)	45 (7.22)	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)	120 (48.89)
PSI	70/59 (21.11/15)	93	94	106	116	119	113	117	125	147	154
	75/63 (23.89/17.22)	97	99	115	125	124	120	126	132	155	162
	80/67 (26.67/19.44)	103	104	123	138	135	129	132	140	162	173
	90/73 (32.22/22.78)	112	113	139	152	149	138	145	154	180	189



5.7. Capacity Request Calculations

Total capacity Request=Σ(Norm code × HP) /10× modify rate+ correction.

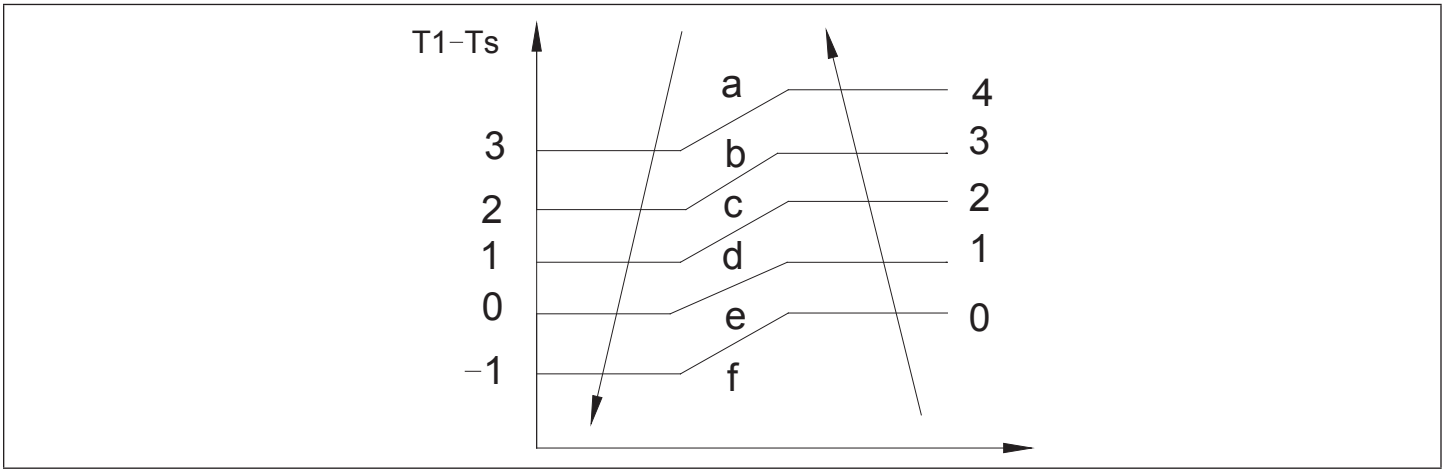


Figure 13. Cooling Mode

Capacity Area	a	b	c	d	e	f
Norm Code (N)	3	2	1.5	1	.5	0

NOTE: *The final result is integer.*

Plus all the indoor capacity request together, then modify it by T4.

When there is only one indoor unit:

	Outdoor Temperature (T4)		
Cooling	>29°C	18°C to 29°C	<17°C
	>84.2°F	64.4°F to 84.2°F	<62.6°F
Modify Rate	100%	60%	40%

When there is more than one indoor unit:

	Outdoor Temperature (T4)		
Cooling	>25°C	17°C - 25°C	<17°C
	>77°F	62.6°F - 77°F	<62.6°F
Modify Rate	100%	80%	40%

NOTE: *The final result is integer.*

In low ambient cooling mode, modify rate is fixed as 40%.

According to the final capacity request to confirm he operating frequency, as following table.

Frequency (Hz)	0	COOL_ F1	COOL_ F2	... ...	COOL_ 15	COOL_ 16
Amendatory capacity demand	0	1	2	... ...	15	16

Meanwhile the maximum running frequency will be adjusted according to the outdoor ambient temp.