

40VMU
Under Ceiling/Floor Indoor Unit for
Variable Refrigerant Flow (VRF) Systems

Engineering Data Book



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I. Under Ceiling/Floor Unit Basic information

1. External Appearance



Figure 1 - 40VMU012/015/018/024---3



Figure 2 - 40VMU030---3



Figure 3 - 40VMU036/048---3

2. Specifications

Table 1 – Data Table

Model		40VMU012---3	40VMU015---3	
Power supply		208/230V-1Ph-60Hz		
Cooling capacity *1	Btu/h	12,000	15,000	
Heating capacity *1	Btu/h	13,500	17,000	
MCA	A	0.44	0.73	
MOCP	A	15		
Filter		Included		
Dimensions (H x W x D)	in.	26 x 39 x 8		
Net Weight	lbs	57.0	62.0	
Heat Exchanger		Inner Groove Copper Tube and Hydrophilic Aluminum fin		
Blower / Motor	Fan Type	Centrifugal		
	Motor Type	DC motor		
	Air Flow Rate (H/M/L)	CFM	335/294/259	441/412/359
	Sound Pressure Level (H/M/L)*2	dB(A)	40.5/37.7/35.8	47.2/45.4/41.7
	Motor Output	W	100	
Min. External Static Pressure (Factory setting)	in. WG	0		
Max. External Static Pressure	in. WG	0.04		
Piping connections	Gas (Low) Pressure	in.	1/2	
	Liquid (High) Pressure	in.	1/4	
	Condensate	in.	5/8	
Refrigerant Control		Electronic Expansion Valve		
Connectable Outdoor Unit		38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump		
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data	
	Control Wiring	AWG	2-core shielded twisted pair cable 20AWG – 16AWG	

NOTES:

*1. Rated per AHRI (Air Conditioning, Heating, and Refrigeration Institute) 1230 Standard

Cooling: Indoor 80°F (27°C) db / 67°F (20°C) wb; Outdoor 95°F (35°C) db

Heating: Indoor 70°F (21°C) db; Outdoor 47°F (8°C) db / 43°F (6°C) wb

*2. These values are measured in anechoic chamber at a distance of 3.3 feet away from the unit and 3.3 feet below the unit (Underceiling) and 3.3 feet away from the unit and 4.9 feet above the ground (Floor).

Table 2 – Data Table

Model		40VMU018---3	40VMU024---3	
Cooling capacity *1	Btu/h	18,000	24,000	
Heating capacity *1	Btu/h	21,000	27,000	
Power supply		208/230V-1Ph-60Hz		
MCA	A	0.87	1.20	
MOCP	A	15		
Filter		Included		
Dimensions (H x W x D)	in.	26 x 39 x 8		
Net Weight	lbs	62.0		
Heat Exchanger		Inner Groove Copper Tube and Hydrophilic Aluminum fin		
Blower / Motor	Fan Type	Centrifugal		
	Motor Type	DC motor		
	Air Flow Rate (H/M/L)	CFM	471/424/394	571/529/494
	Sound Pressure Level (H/M/L)*2	dBA	48.5/46.5/44.1	53.8/52.0/50.2
	Motor Output	W	100	
Min. External Static Pressure (Factory setting)	in. WG	0		
Max. External Static Pressure	in. WG	0.04		
Piping connections	Gas (Low) Pressure	in.	5/8	
	Liquid (High) Pressure	in.	3/8	
	Condensate	in.	5/8	
Refrigerant Control		Electronic Expansion Valve		
Connectable Outdoor Unit		38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump		
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data	
	Control Wiring	AWG	2-core shielded twisted pair cable 20AWG – 16AWG	

NOTES:

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Cooling: Indoor 80°F (27°C) db / 67°F (20°C) wb; Outdoor 95°F (35°C) db

Heating: Indoor 70°F (21°C) db; Outdoor 47°F (8°C) db / 43°F (6°C) wb

*2. These values are measured in anechoic chamber at a distance of 3.3 feet away from the unit and 3.3 feet below the unit (Underceiling) and 3.3 feet away from the unit and 4.9 feet above the ground (Floor).

Table 3 – Data Table

Model		40VMU030---3	40VMU036---3	
Power supply		208/230V-1Ph-60Hz		
Cooling capacity *1	Btu/h	30,000	36,000	
Heating capacity *1	Btu/h	34,000	40,000	
MCA	A	1.40	1.80	
MOCP	A	15		
Filter		Included		
Dimensions (H x W x D)	in.	26 x 50-1/2 x 8	27 x 66 x 10	
Net Weight	lbs	77.0	106.0	
Heat Exchanger		Inner Groove Copper Tube and Hydrophilic Aluminum fin		
Blower / Motor	Fan Type	Centrifugal		
	Motor Type	DC motor		
	Air Flow Rate (H/M/L)	CFM	729/676/624	1094/976/906
	Sound Pressure Level (H/M/L)*2	dB(A)	53.9/52.1/50.4	53.0/50.3/48.4
	Motor Output	W	100	100*2
Min. External Static Pressure (Factory setting)		in. WG	0	
Max. External Static Pressure		in. WG	0.04	
Piping connections	Gas (Low) Pressure	in.	5/8	
	Liquid (High) Pressure	in.	3/8	
	Condensate	in.	5/8	
Refrigerant Control		Electronic Expansion Valve		
Connectable Outdoor Unit		38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump		
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data	
	Control Wiring	AWG	2-core shielded twisted pair cable 20AWG – 16AWG	

NOTES:

*1. Rated per AHRI (Air Conditioning, Heating, and Refrigeration Institute) 1230 Standard

Cooling: Indoor 80°F (27°C) db / 67°F (20°C) wb; Outdoor 95°F (35°C) db

Heating: Indoor 70°F (21°C) db; Outdoor 47°F (8°C) db / 43°F (6°C) wb

*2. These values are measured in anechoic chamber at a distance of 3.3 feet away from the unit and 3.3 feet below the unit (Underceiling) and 3.3 feet away from the unit and 4.9 feet above the ground (Floor).

Table 4 – Data Table











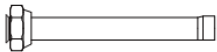

Model		40VMU048---3	
Power supply		208/230V-1Ph-60Hz	
Cooling capacity *1	Btu/h	48,000	
Heating capacity *1	Btu/h	54,000	
MCA	A	2.80	
MOCP	A	15	
Filter		Included	
Dimensions (H x W x D)	in.	27 x 66 x 10	
Net Weight	lbs.	106.0	
Heat Exchanger		Inner Groove Copper Tube and Hydrophilic Aluminum fin	
Blower / Motor	Fan Type		Centrifugal
	Motor Type		DC motor
	Air Flow Rate (H/M/L)	CFM	1353/1000/929
	Sound Pressure Level (H/M/L)*2	dBA	59.8/52.3/50.6
	Motor Output	W	100*2
Min. External Static Pressure (Factory setting)		in. WG	0
Max. External Static Pressure		in. WG	0.04
Piping connections	Gas (Low) Pressure	in.	5/8
	Liquid side (High) Pressure	in.	3/8
	Condensate	in.	5/8
Refrigerant Control		Electronic Expansion Valve	
Connectable Outdoor Unit		38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump	
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data
	Control Wiring	AWG	2-core shielded twisted pair cable 20AWG – 16AWG

NOTES:

- *1. Rated per AHRI (Air Conditioning, Heating, and Refrigeration Institute) 1230 Standard
Cooling: Indoor 80°F (27°C) db / 67°F (20°C) wb; Outdoor 95°F (35°C) db
Heating: Indoor 70°F (21°C) db; Outdoor 47°F (8°C) db / 43°F (6°C) wb
- *2. These values are measured in anechoic chamber at a distance of 3.3 feet away from the unit and 3.3 feet below the unit (Underceiling) and 3.3 feet away from the unit and 4.9 feet above the ground (Floor).

3. Accessories

Table 5 – Table of Accessories

Name of Accessories	Quantity	Outline	Usage
Condensate connector	1		For drainage
Copper Nut	1		Pipe connection
Clamp	1		Connect the drain hose to condensate connection
Flexible conduit and connectors	1		Routing power lines
Hanging bracket	4		Used for hanging the unit
Installation guide for metallic flexible pipe	1		
Mounting bracket	4		Used for mounting the unit---
PQ Connection Wire	2		Connect indoor unit, outdoor unit, and sub MDC
Connection wire	1		Occupancy sensor connecting wire
Gas side copper pipe (for 012-024 only)	1		For routing refrigerant pipes to the side of the unit
Liquid side copper pipe (for 012-024 only)	1		
Gas side copper pipe	1		For routing refrigerant pipes to the side of the unit
Liquid side copper pipe	1		For routing refrigerant pipes to the rear or bottom of the unit
Bolt assembly	4		---

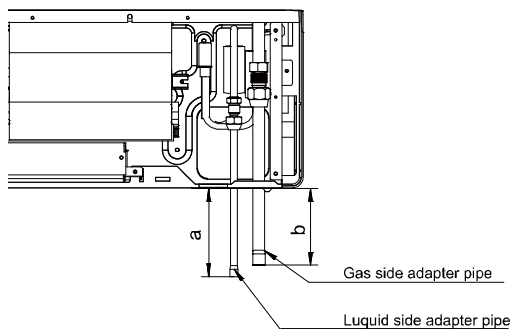


Figure 4 – Under Connection

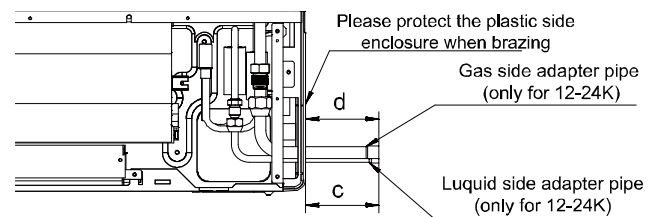


Figure 5 – Side Connection

Table 6 – Under/Side Connection

Capacity index	36/48	12	15	18	30
a	2-3/4	2-1/4	2-1/4	4-3/4	5
b	2-3/4	2-1/4	2	4	5-1/4
c	-	4	4	4	-
d	-	4	4	4	-

II. Piping Diagram

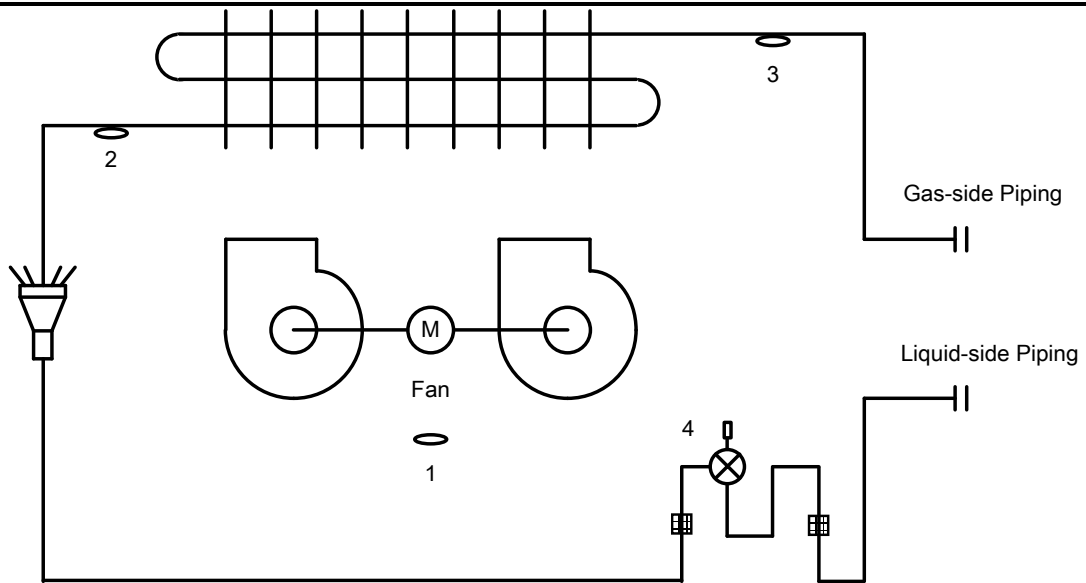


Figure 6 - Piping

Table 7 - Piping

NO.	Symbol	Name
1	T1	Room temperature sensor
2	T2A	Inlet pipe temperature sensor
3	T2B	Outlet pipe temperature sensor
4	EEV	Electronic expansion valve

Table 8 - Gas/Liquid Line Sizes

Model	Gas	Liquid
40VMU012/015---3	1/2	1/4
40VMU018/024/030/036/048---3	5/8	3/8

III. Dimensions

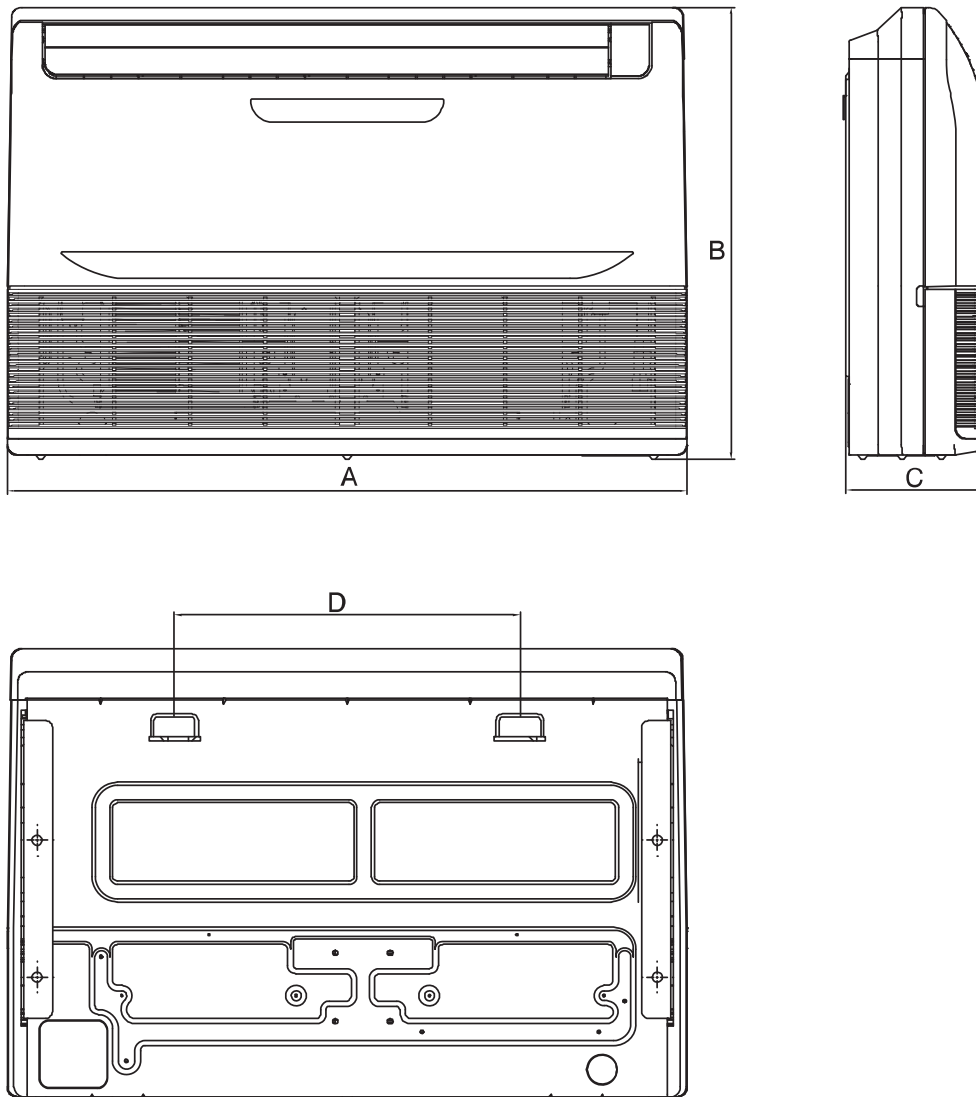


Figure 7 – 40VMW007/009/012/015/018/024/030---3

Table 9 – Dimensions

Model	A	B	C	D
40VMU012/015/018/024---3	39	26	8	19-7/8
40VMU030---3	50-1/2	26	8	31-1/4

NOTE: All dimensions are shown in inches.

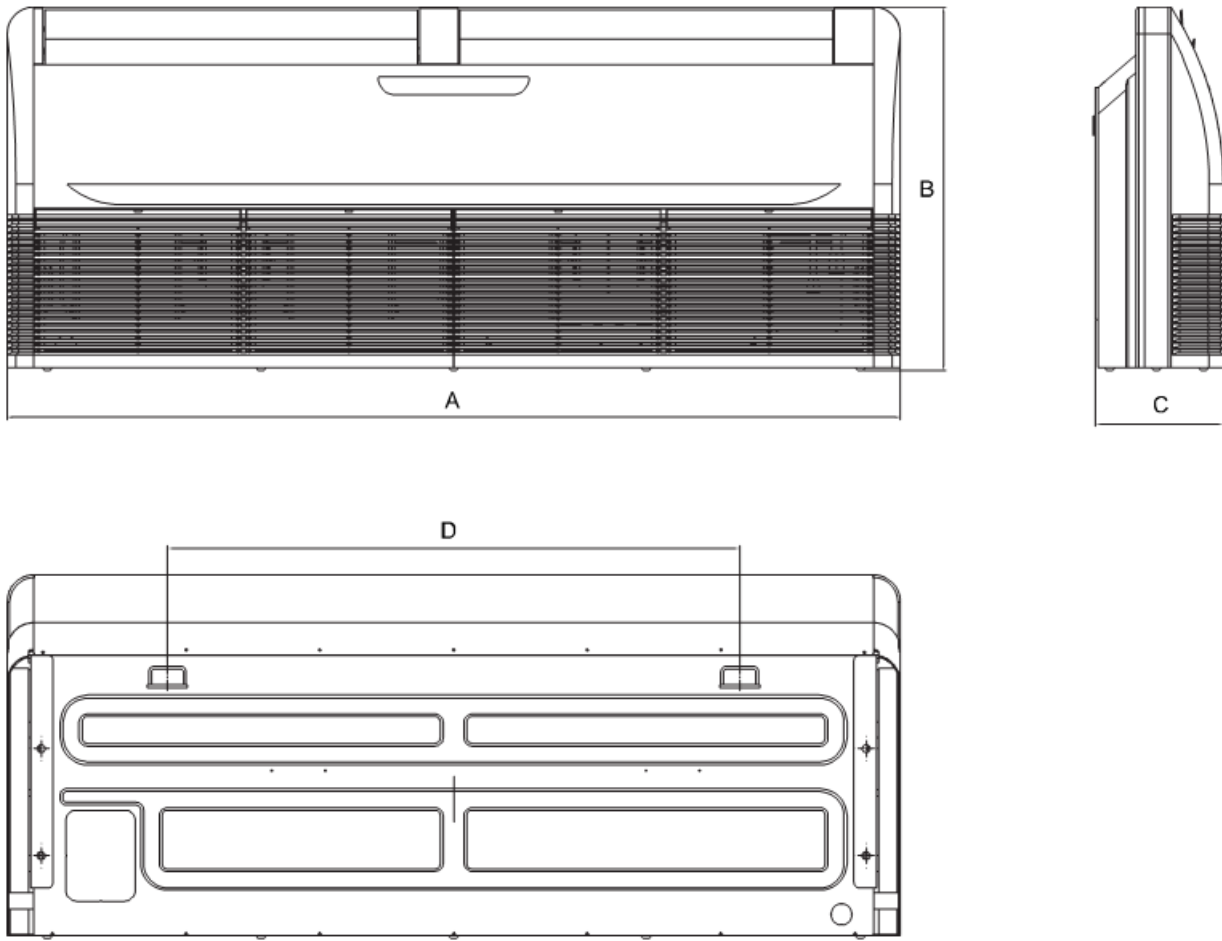


Figure 8 - 40VMU036/048---3

Table 10 - Dimensions (036/048)

Model	A	B	C	D
40VMU036/048---3	66	27	10	42-1/8

NOTE: All dimensions are shown in inches.

IV. Wiring Diagram

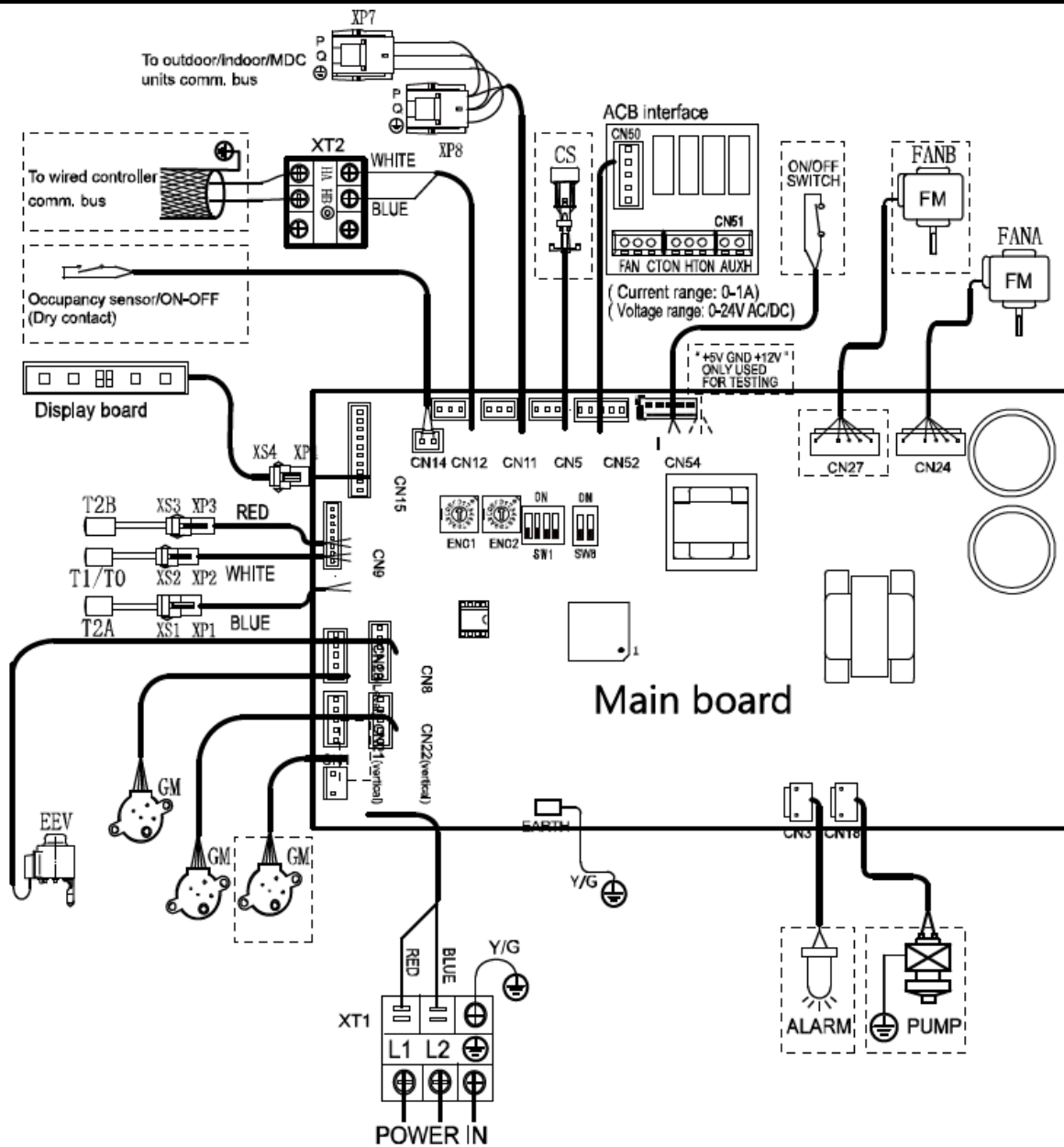


Figure 9 – 40VMU012/015/018/024/030/036/048---3

Legend:

- | | | | |
|--------------|--------------------------------|--------------|---------------------------------------|
| ACB | – Auxiliary Control Board | HTON | – Output for Heating Operation |
| ALARM | – Warning Lamp | PUMP | – Pump Motor |
| AUXH | – Output for Auxiliary Heat | T1/T0 | – Room Temperature Sensor |
| CS | – Condensate Switch | T2A | – Inlet Pipe Temperature Sensor |
| CTON | – Output for Cooling Operation | T2B | – Outlet Pipe Temperature Sensor |
| EEV | – Electronic Expansion Valve | XP1-8 | – Connectors |
| FAN | – DC Indoor Fan | XS1-4 | – Connectors |
| FM | – Fan Motor | XT1-2 | – Terminal |
| GM | – Swing Motor | ----- | – Optional Component for Field Wiring |

a. 40VMC007 – 015 Wiring Diagram Definitions and Settings

Table 11 – Code / Title

Code	Title
FM	Indoor Fan Motor
T1/T0	Room Temperature Sensor
T2A	Inlet Pipe Temperature Sensor
T2B	Outlet Pipe Temperature Sensor
ALARM	Warning Lamp
EEV	Electronic Extension Valve
XP1-8	Connectors
XS1-4	
XT1-2	Terminal
PUMP	Pump Motor
CS	Condensate Switch
GM	Swing Motor

Table 12 – SW1 Definition

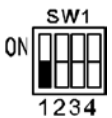
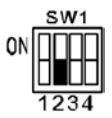

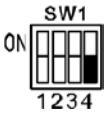
	0 means auto addressing mode (Default)
	1 means factory test mode
	0 means normal mode (Default)
	1 means factory self-checking mode (Reserved)
	Reserved
	0 means standard indoor unit (Default)
	1 means main indoor unit (must be addressed #63)

Table 13 – ENC1 / ENC2



 ENC1	Reserved	 ENC2	Reserved
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Table 14 – J1 Definition



	Without Jumper “J1” for auto restart function
	With Jumper “J1” for manual restart function

Table 15 – SW8 Definition



	Reserved
	Reserved

Table 16 – 0/1 Definition



	Means 0
	Means 1

Table 17 – Error Code / Content

dd	Heating / Cooling Conflict
E1	Communication Error with Outdoor Unit
E2	Temperature Sensor (T1/T0) Error
E4	Temperature Sensor (T2B) Error
E5	Temperature Sensor (T2A) Error
E6	DC Fan Error
E7	EEPROM Error (Data Storage)
UU	MDC Error in Auto System-Check Mode
E9	Communication Error with Wired Controller
Eb	EEV Error
EC	Indoor Fan Error in Auto System-Check Mode
Ed	Outdoor Unit Error
EE	Condensate Error
FE	No Address when Powered On for First Time

V. Electrical Characteristics

Table 18 – Electrical Characteristics

Model	Power supply				IFM		
	Hz	Volts	Voltage range	MCA	MOCP	KW	FLA
40VMU012---3	60	208/230V	Max 253V Min 187V	0.44	15	0.01	0.35
40VMU015---3				0.73	15	0.01	0.58
40VMU018---3				0.87	15	0.01	0.69
40VMU024---3				1.20	15	0.01	0.92
40VMU030---3				1.40	15	0.01	1.10
40VMU036---3				1.80	15	0.1*2	0.69*2
40VMU048---3				2.80	15	0.1*2	1.1*2

MCA: Minimum Circuit Amps (A)

MOCP: Maximum Overcurrent Protection (A)

Symbols: KW : Fan Motor Rated Output (KW)

FLA : Full Load Amps (A)

IFM : Indoor Fan Motor

VI. Air Throw Charts

1. 40VMU012---3

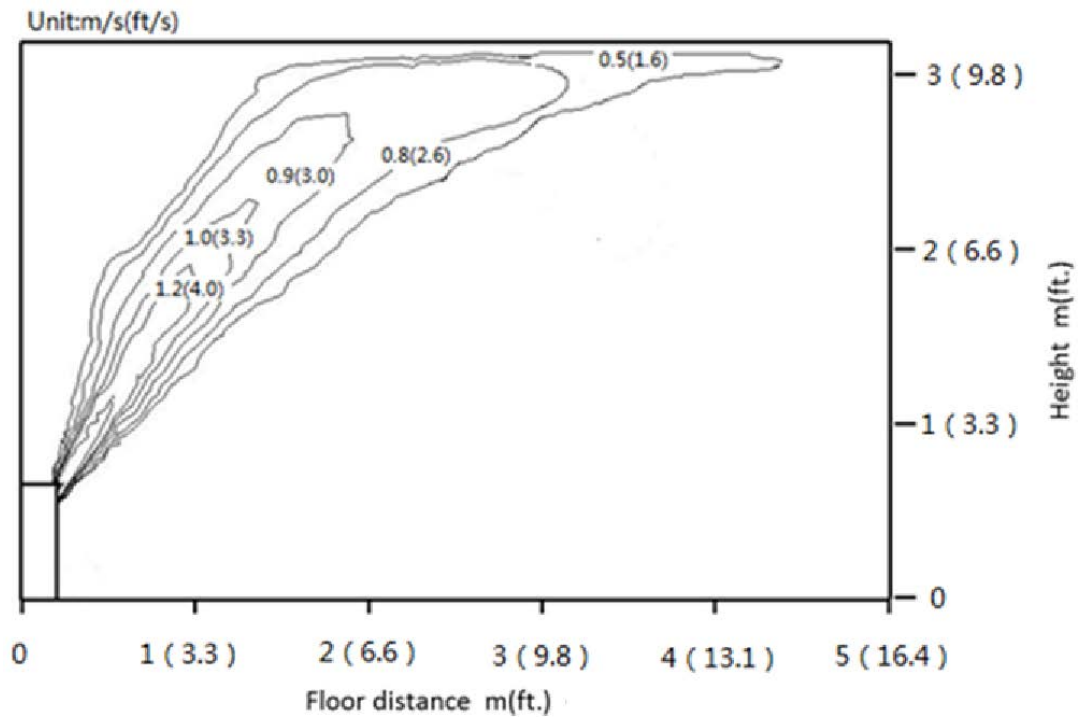


Figure 10 - Cooling mode with 60° swing

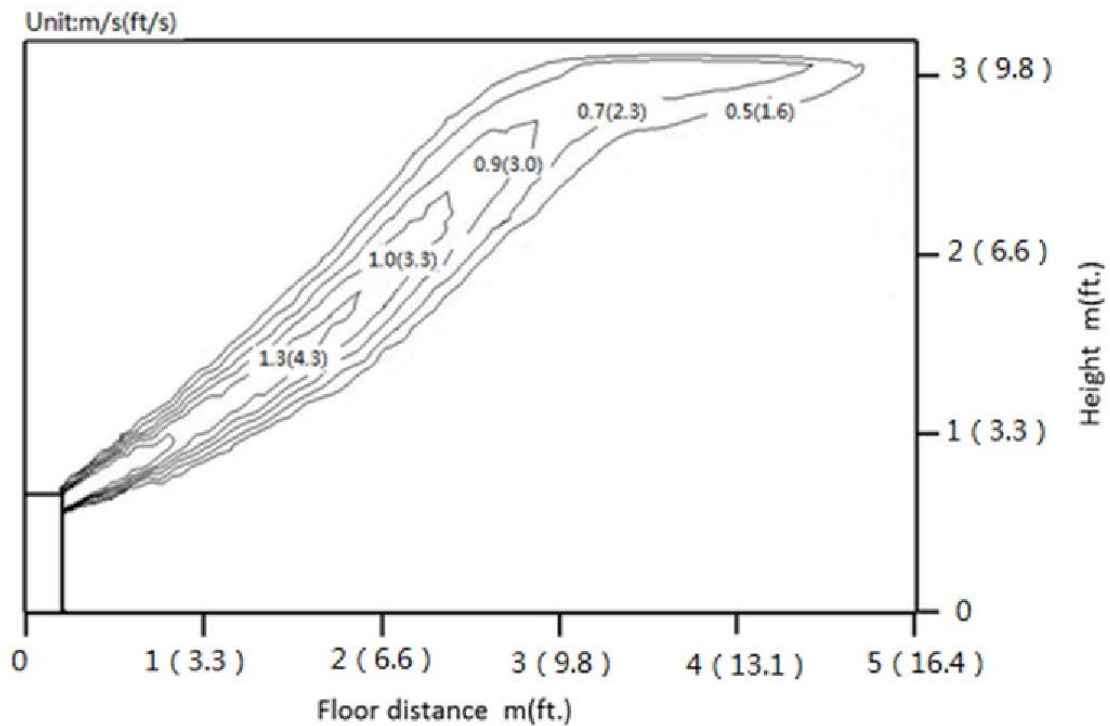


Figure 11 - Heating mode with 60° swing

2. 40VMU015---3

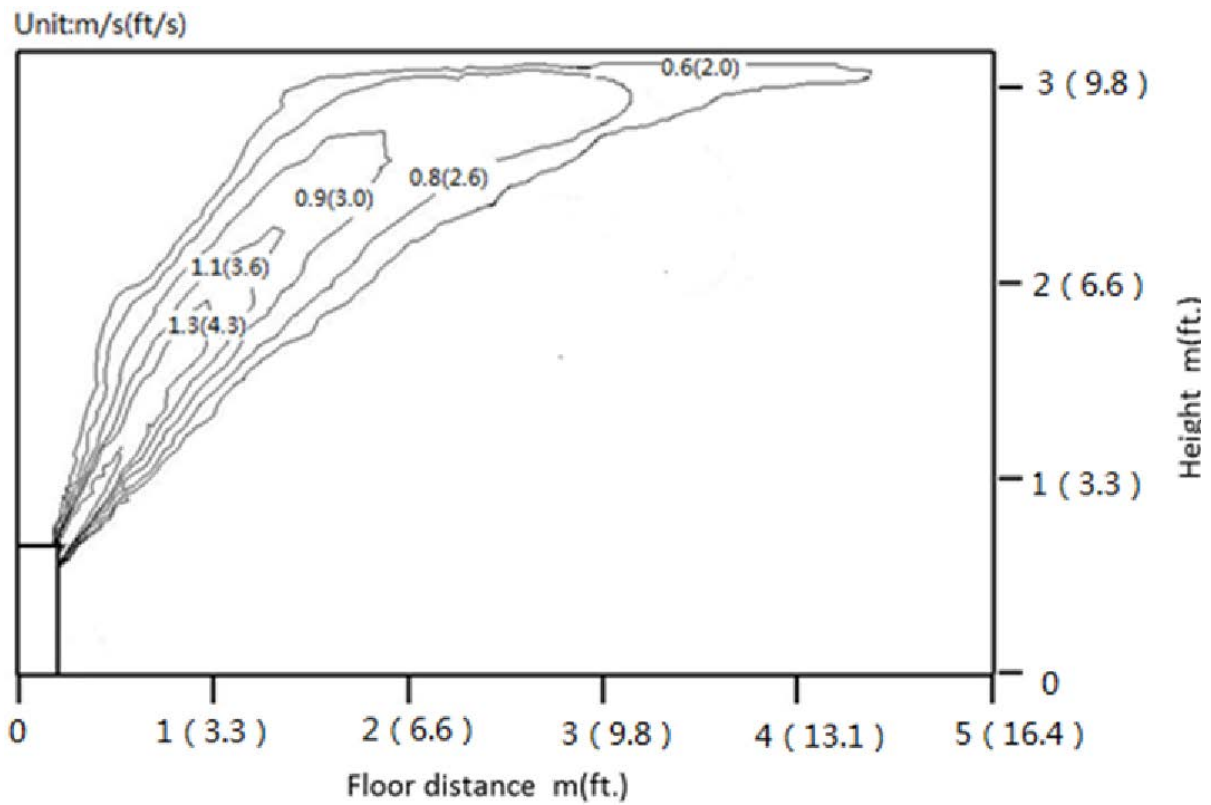


Figure 12 - Cooling mode with 60° swing

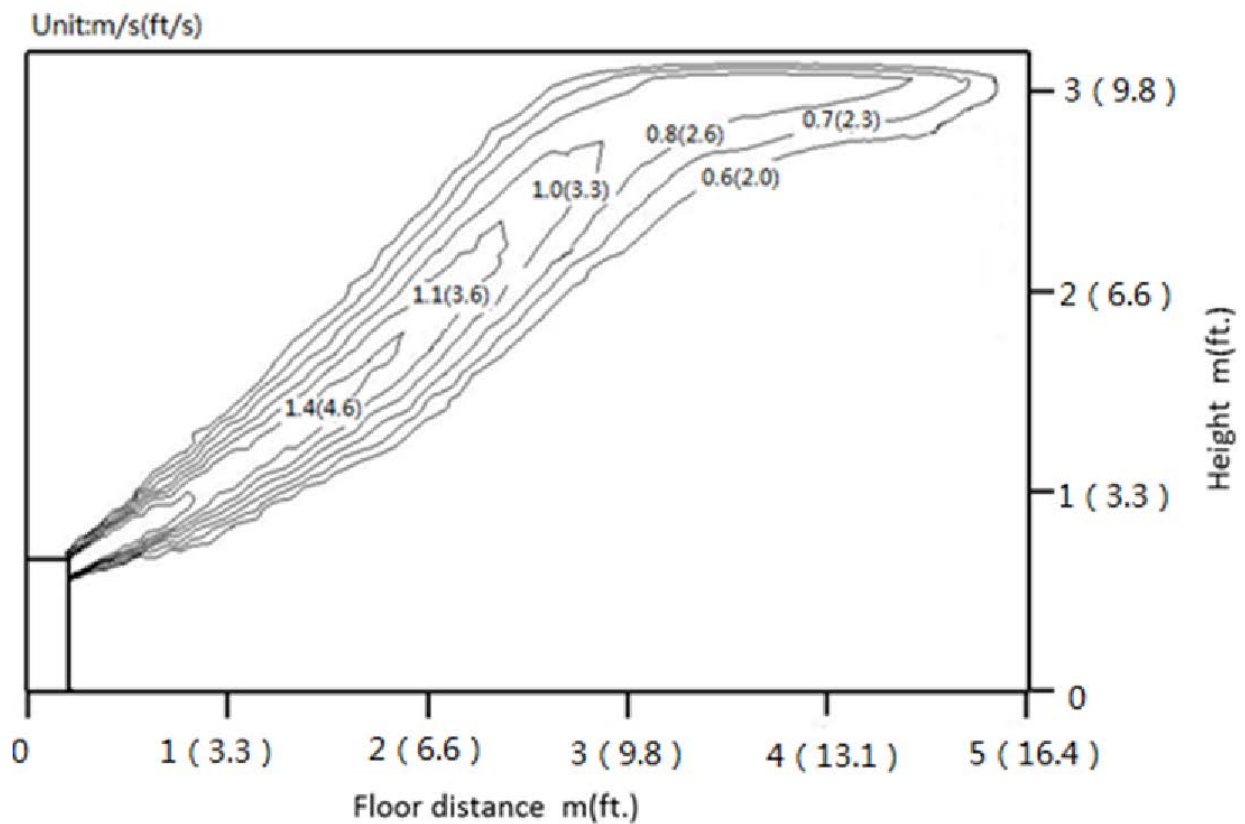


Figure 13 - Heating mode with 60° swing

3. 40VMU018---3

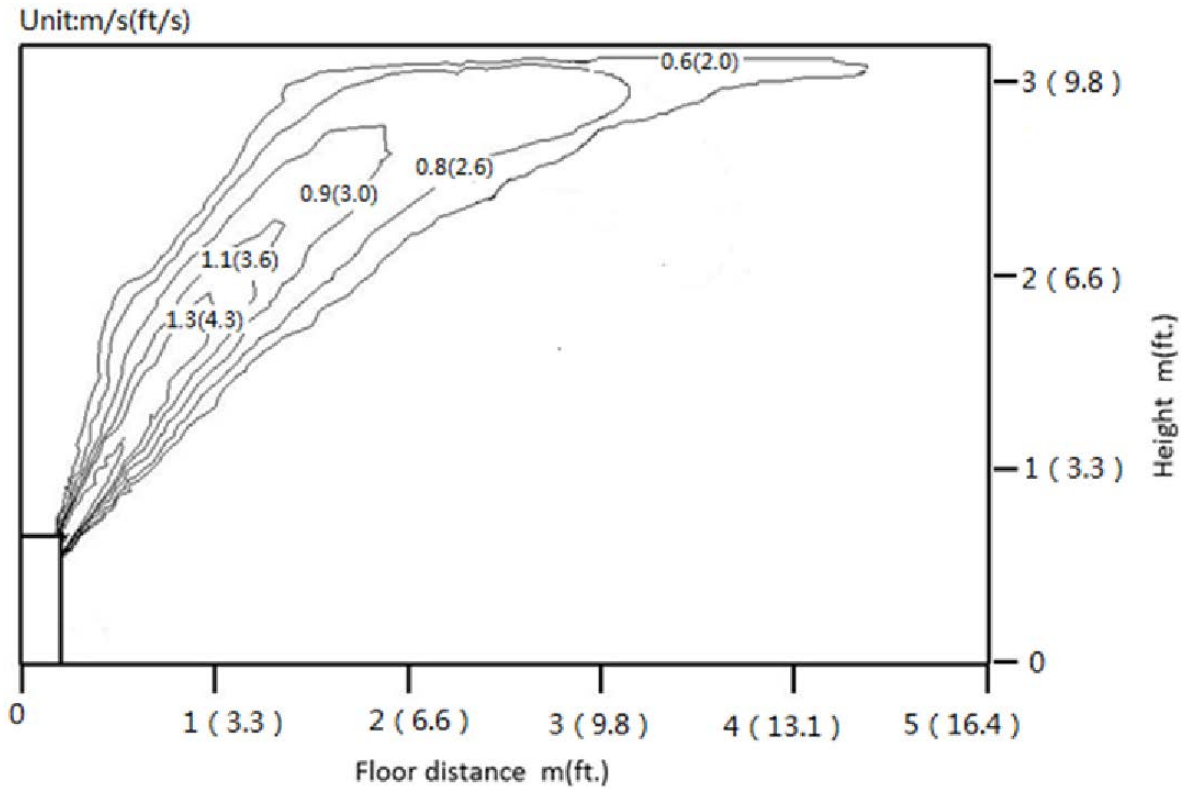


Figure 14 - Cooling mode with 60° swing

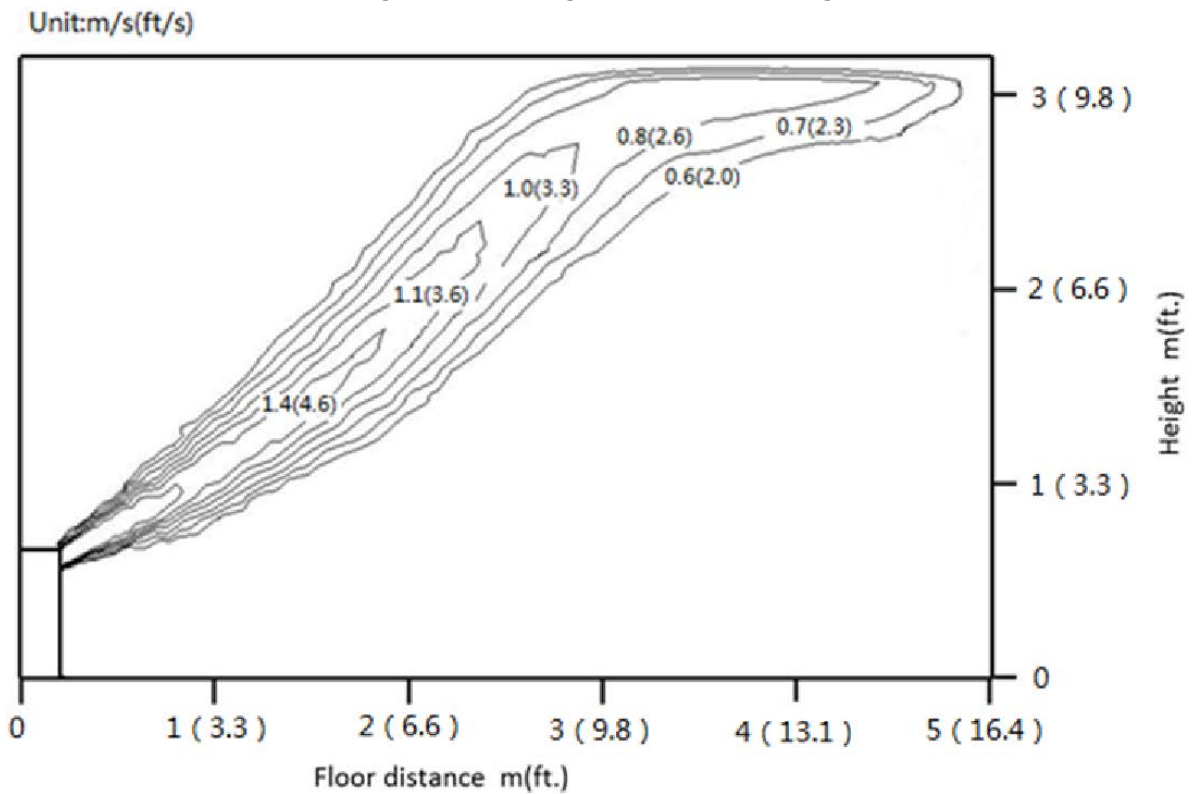


Figure 15 - Heating mode with 60° swing

4. 40VMU024---3

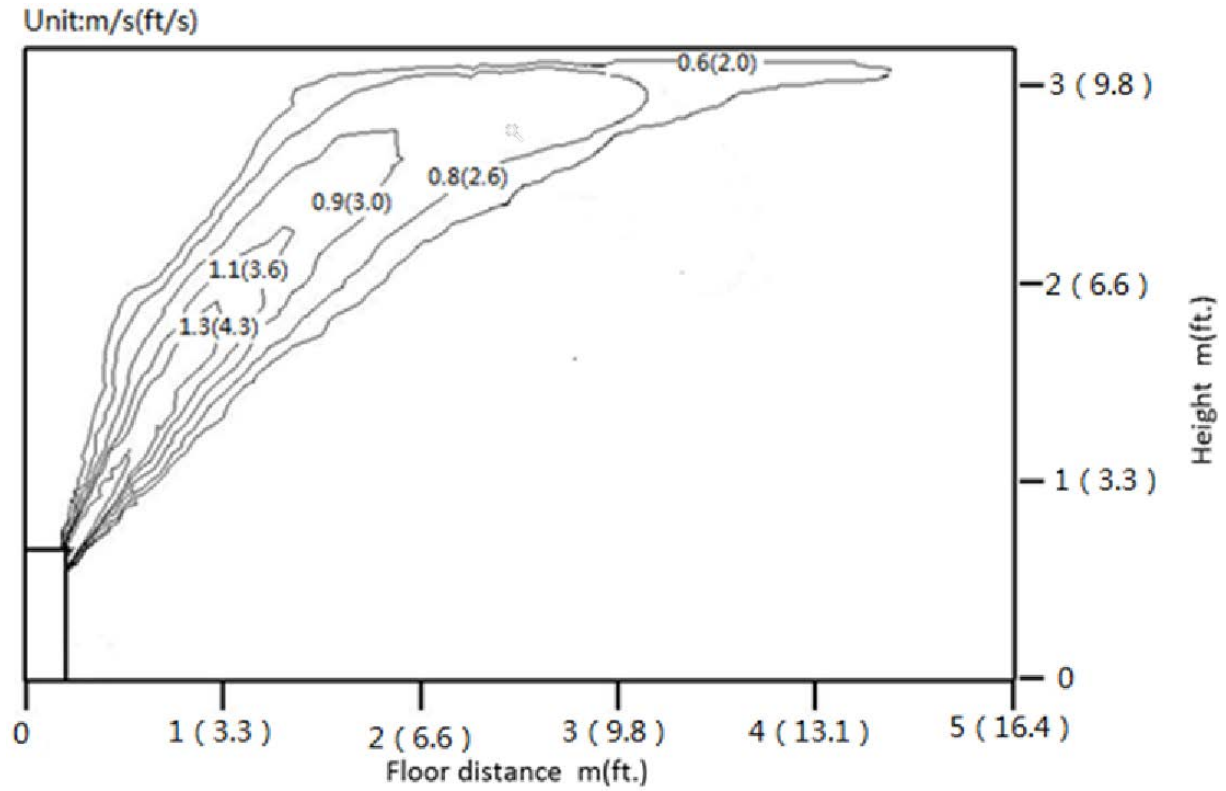


Figure 16 - Cooling mode with 60° swing

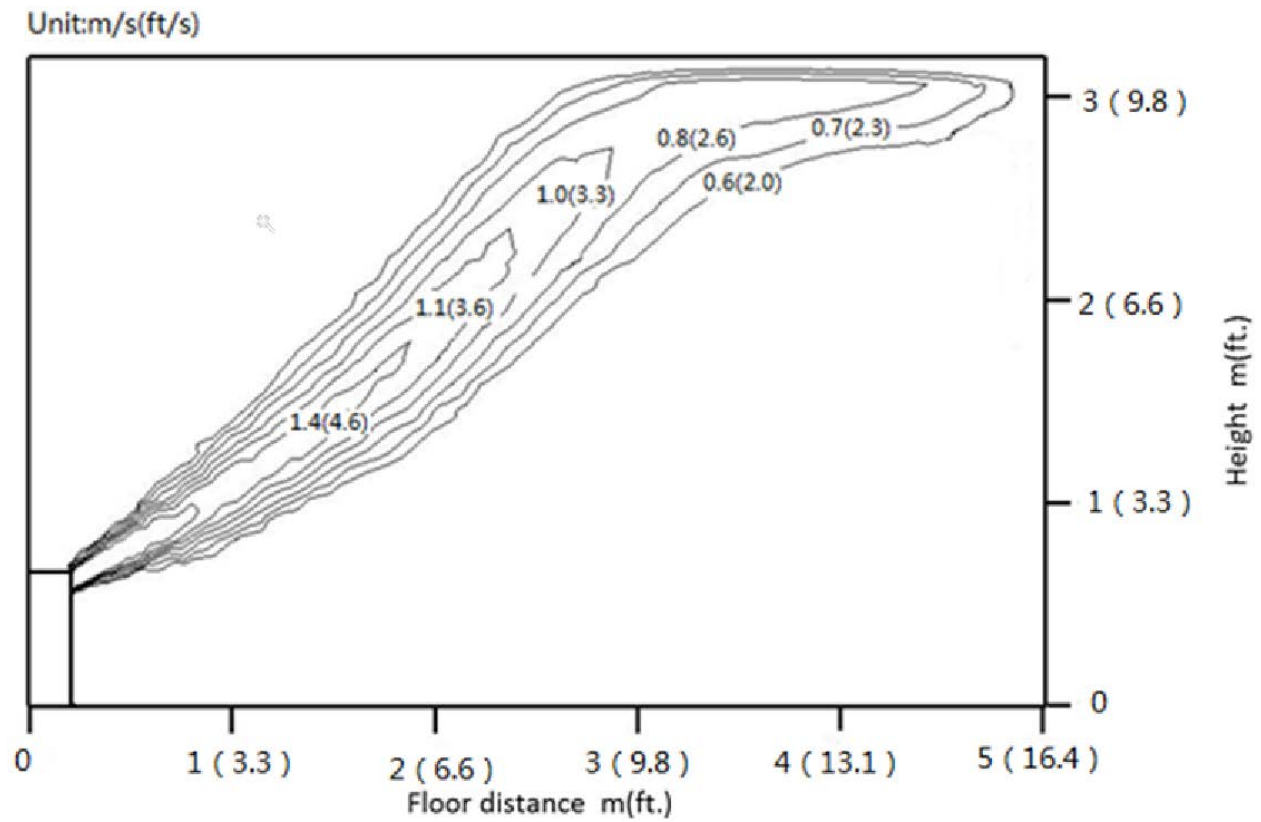
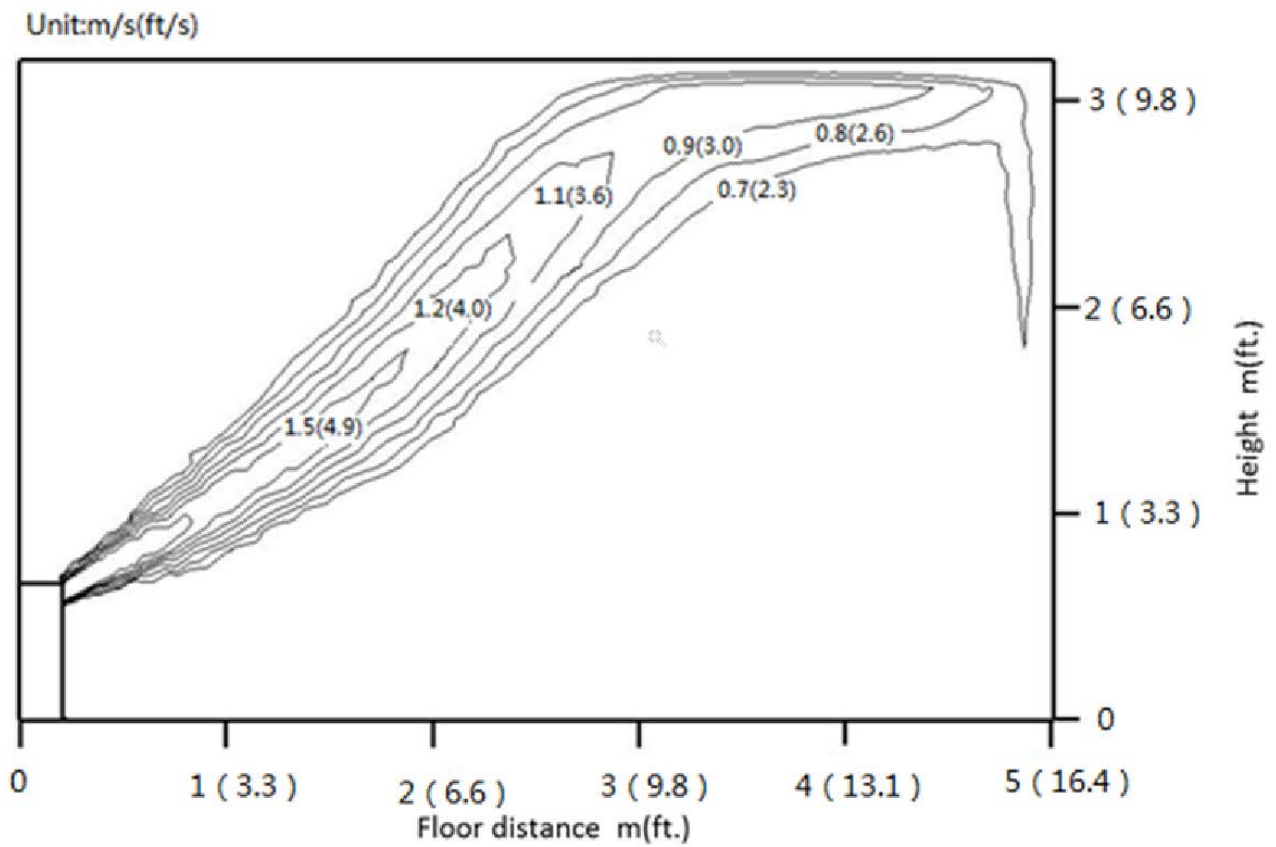
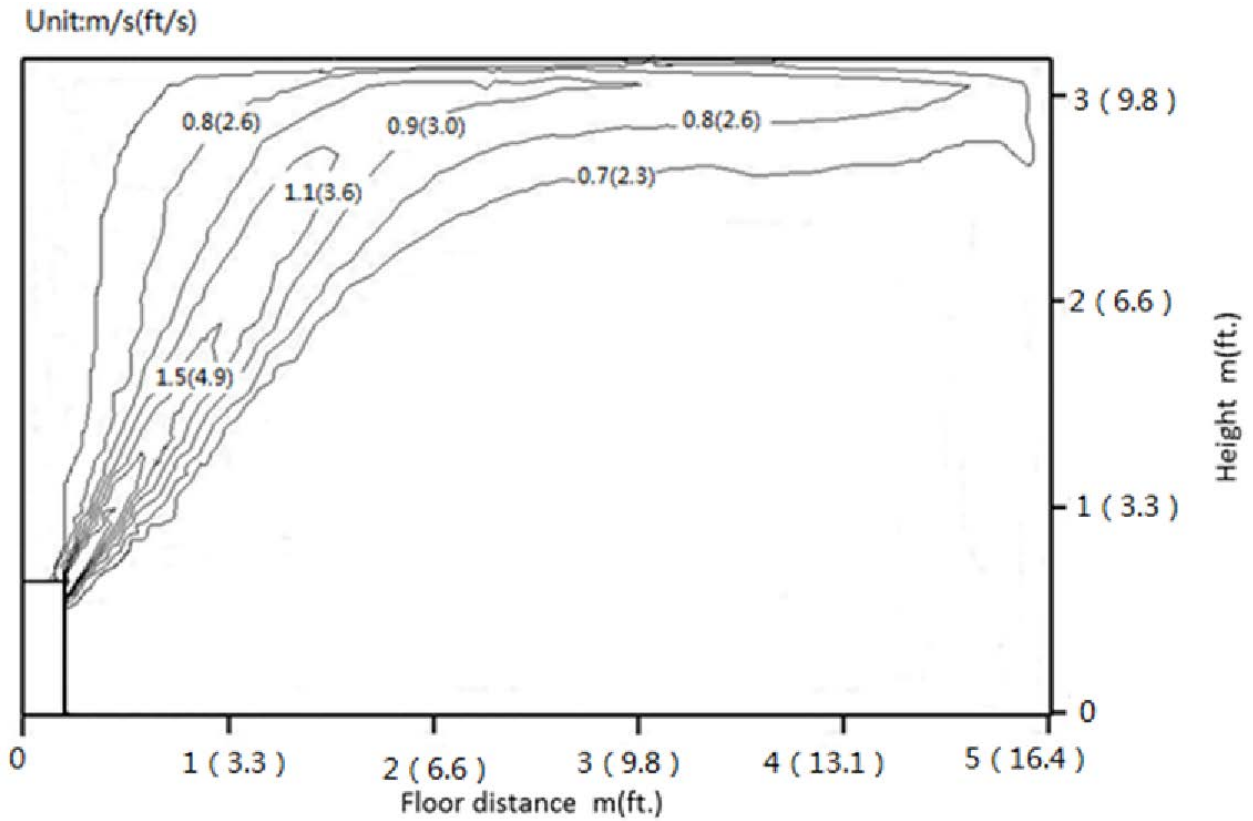


Figure 17 - Heating mode with 60° swing

5. 40VMU030---3



6. 40VMU036---3

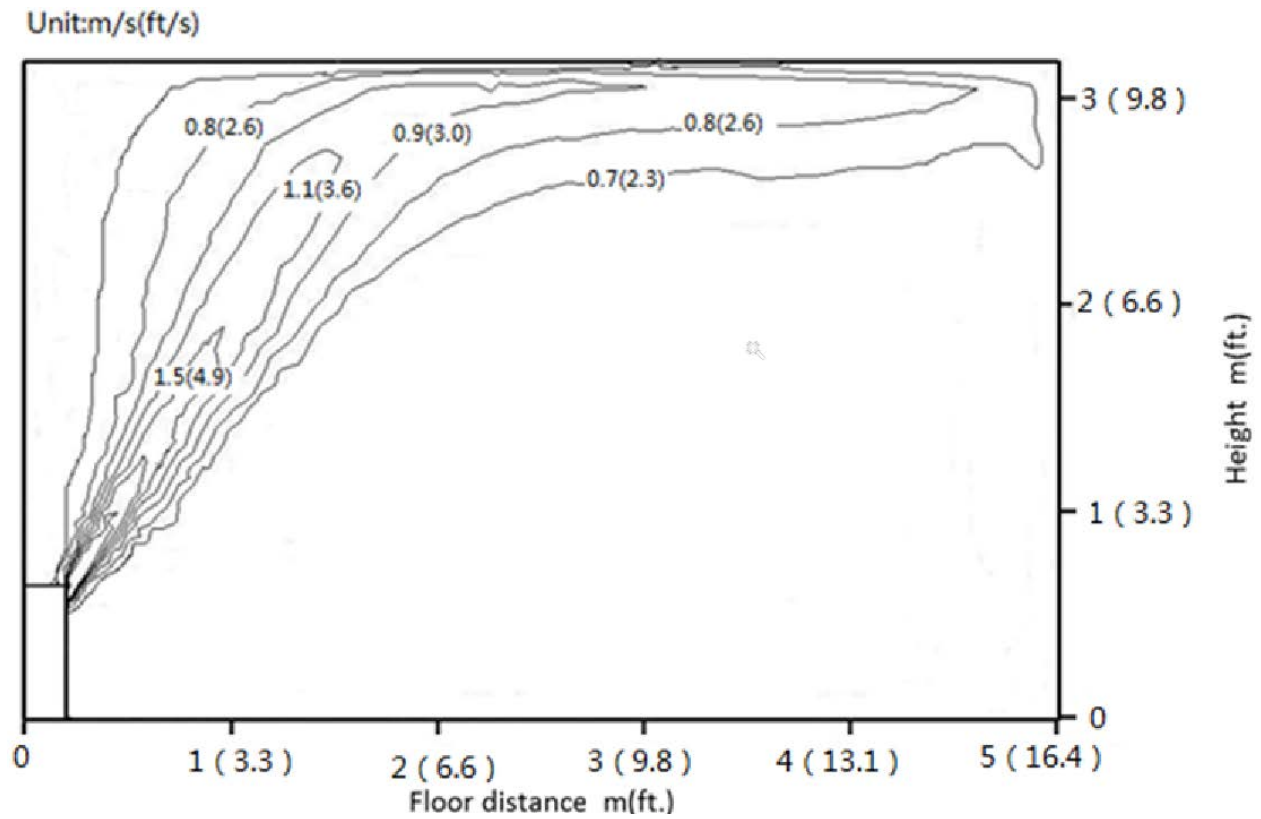


Figure 20 – Cooling mode with 60° swing

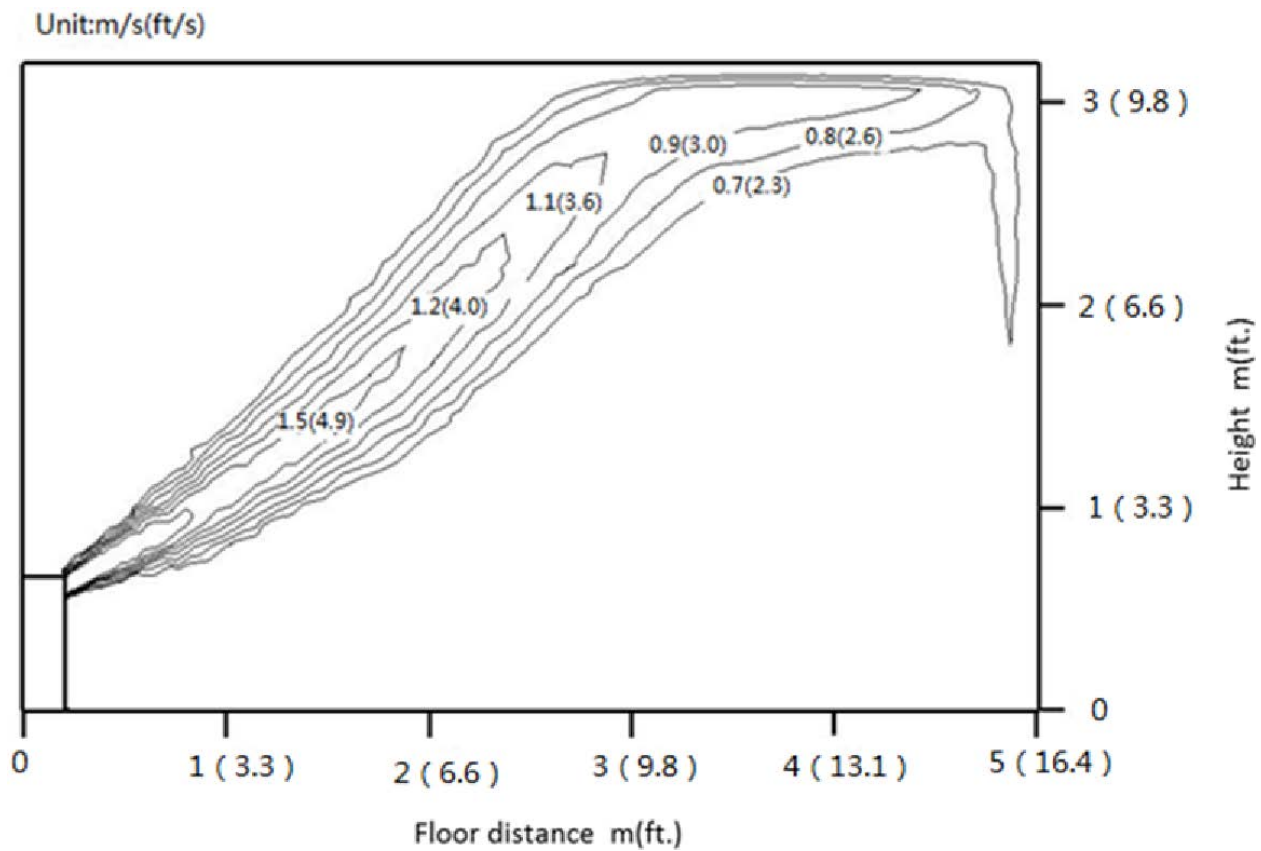


Figure 21 – Heating mode with 60° swing

7. 40VMU048---3

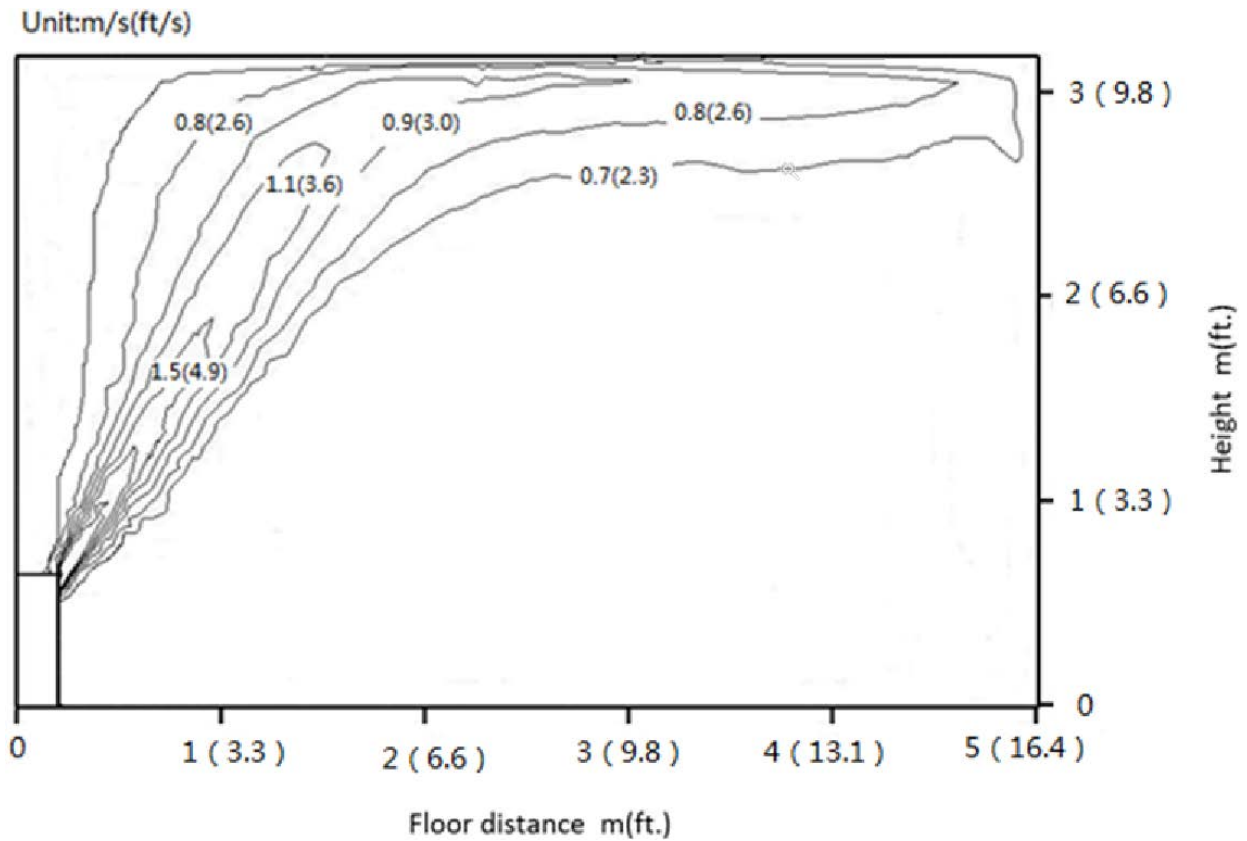


Figure 22 – Cooling mode with 60° swing

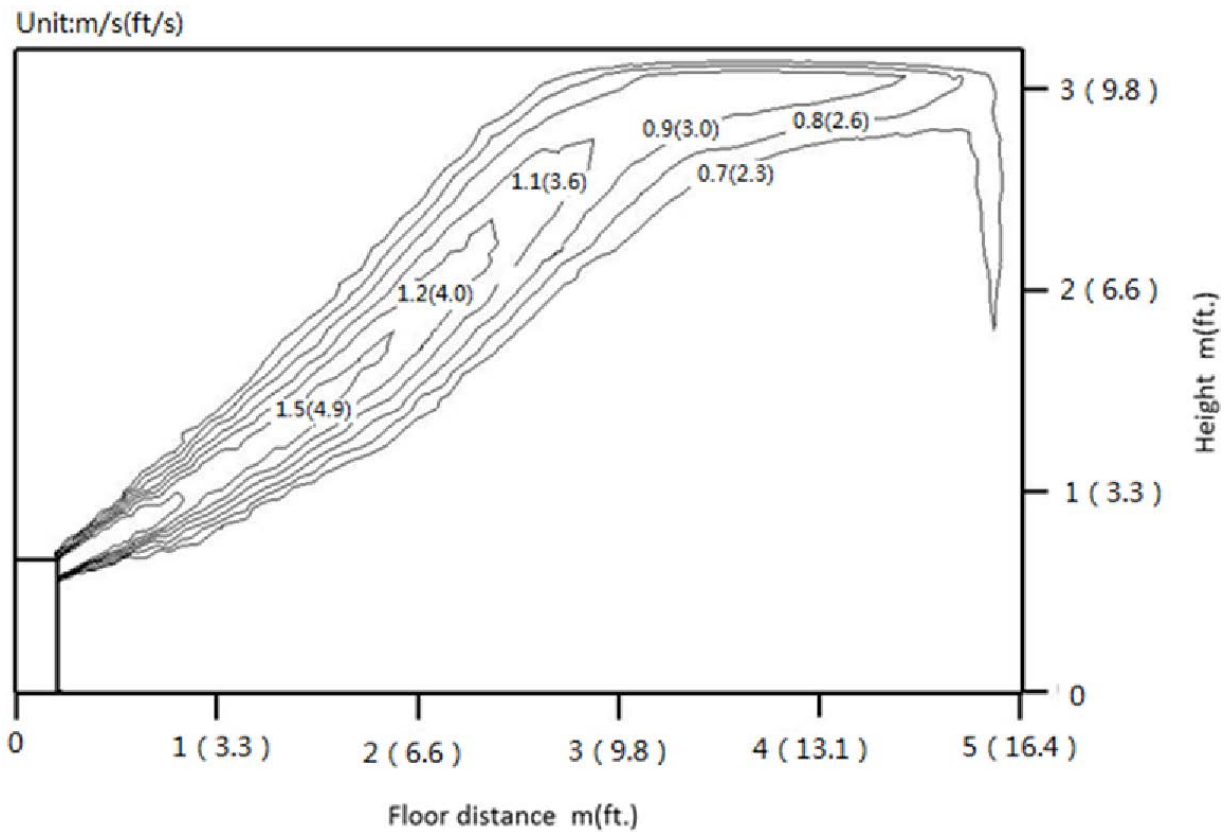


Figure 23 – Heating mode with 60° swing

VII. Sound Data

1. Sound Pressure Levels

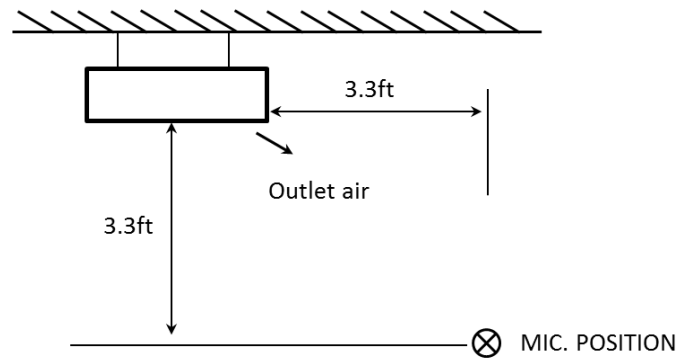


Figure 24 – Overall Sound Levels

Table 19 – Cooling Mode

Model	H	M	L
40VMU012---3	37.7	35.7	33.9
40VMU015---3	45.2	43.6	40.2
40VMU018---3	46.3	44.2	42.3
40VMU024---3	51.3	49.4	47.5
40VMU030---3	51.5	49.6	47.9
40VMU036---3	52.1	49.3	47.7
40VMU048---3	59	51.4	49.8

Table 20 – Heating Mode

Model	H	M	L
40VMU012---3	39.5	36.4	34.7
40VMU015---3	45.6	43.9	40.5
40VMU018---3	46.9	45.1	42.5
40VMU024---3	52.6	50.5	48.5
40VMU030---3	52.4	50.6	48.6
40VMU036---3	51.6	49	46.6
40VMU048---3	58	50.6	48.6

NOTE: Units are dBA.

2. Floor Installation

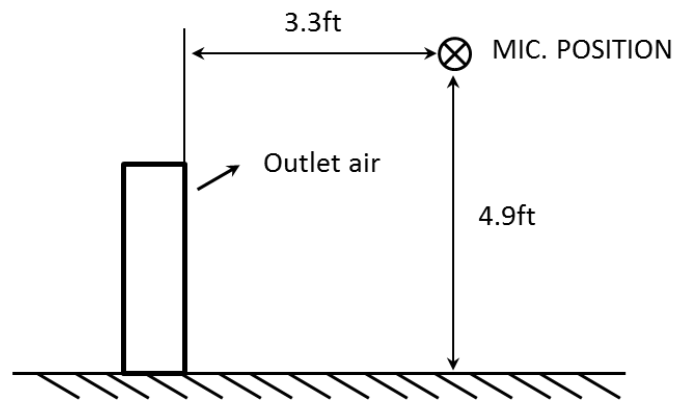


Figure 25 – Floor Installation

Table 21 – Cooling Mode

Model	H	M	L
40VMU012---3	39.9	37.3	35.8
40VMU015---3	46.7	45	41.5
40VMU018---3	48.1	46.5	44.1
40VMU024---3	53.7	51.8	50
40VMU030---3	53	51.4	49.7
40VMU036---3	53	50.3	48.4
40VMU048---3	59.8	52.3	50.6

Table 22 – Heating Mode

Model	H	M	L
40VMU012---3	40.5	37.7	35.5
40VMU015---3	47.2	45.4	41.7
40VMU018---3	48.5	46.3	44
40VMU024---3	53.8	52	50.2
40VMU030---3	53.9	52.1	50.4
40VMU036---3	51.3	48.8	46.8
40VMU048---3	57.8	50.5	48.7

3. NC Curves

NOTES:

External Static Pressure: 0 in. (0 Pa)

Power source: 208/230V-1Ph-60Hz

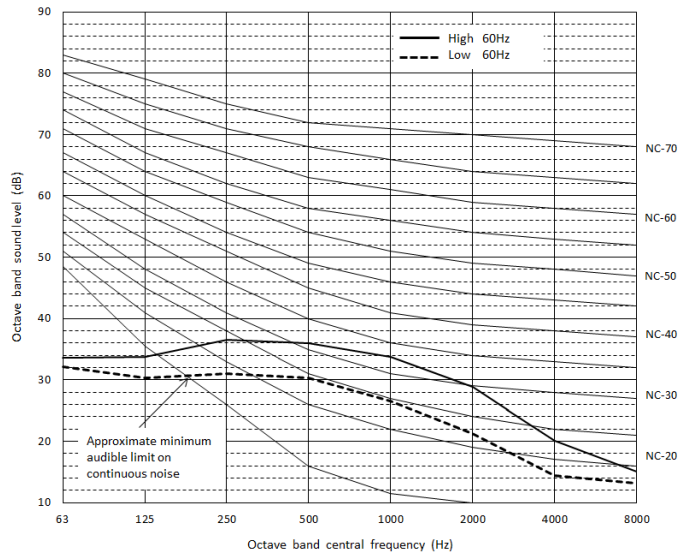


Figure 26 – 40VMU012---3

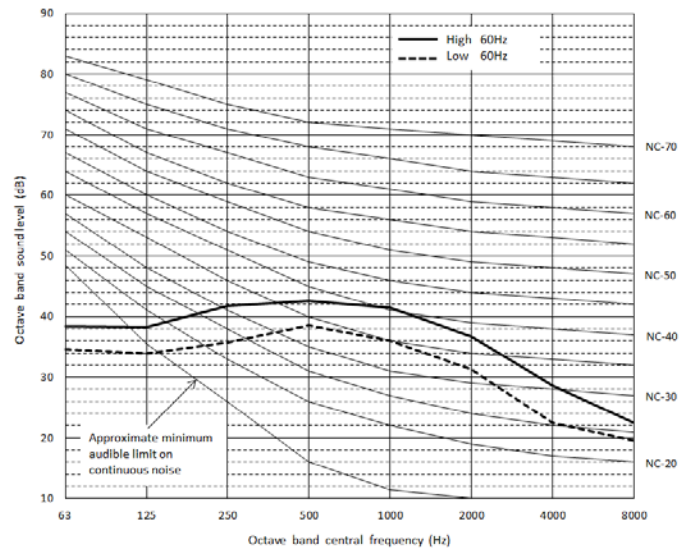


Figure 27 – 40VMU015---3

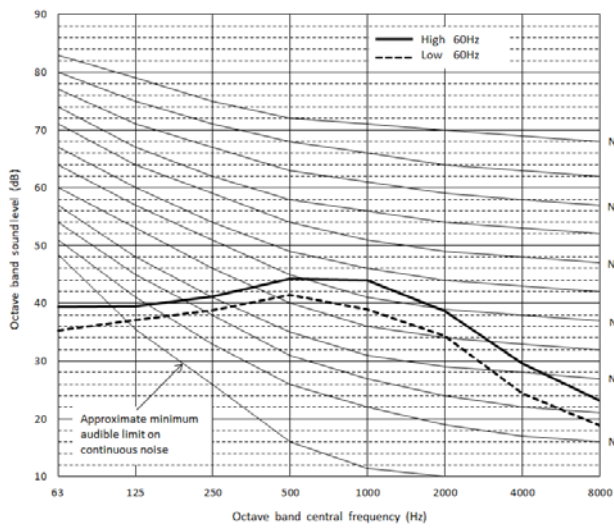


Figure 28 – 40VMU018---3

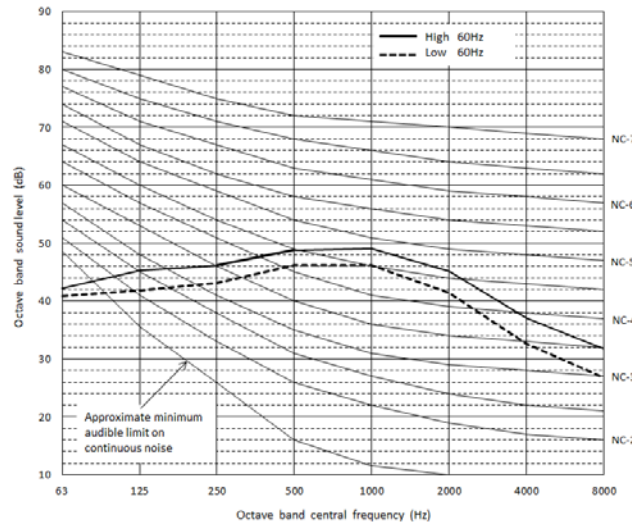


Figure 29 – 40VMU024---3

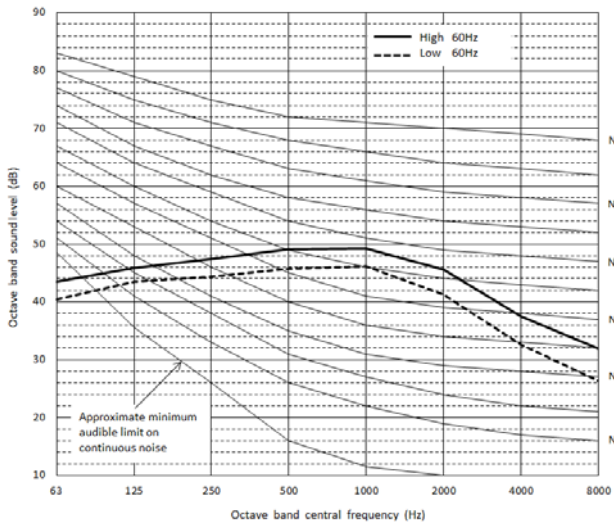


Figure 30 – 40VMU030---3

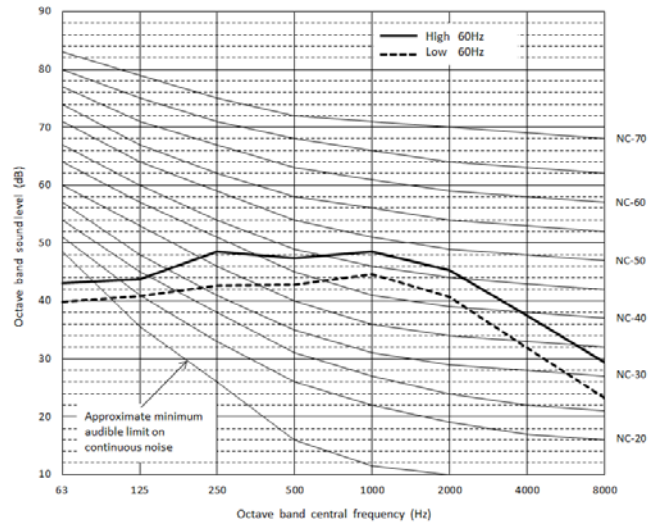


Figure 31 – 40VMU036---3

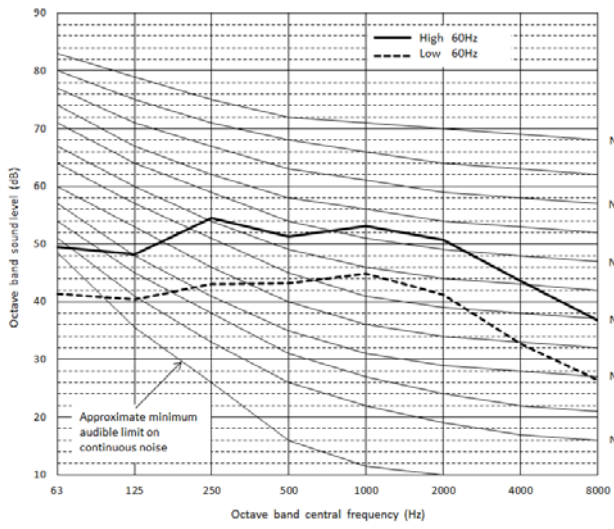


Figure 32 – 40VMU048---3

VIII. Capacity Data Tables

Table 23 – Cooling Capacity

Model	Unit Size	Indoor air temp.											
		68°F DB / 57°F WB		71°F DB / 60°F WB		75°F DB / 63°F WB		80°F DB / 67°F WB		85°F DB / 71°F WB		90°F DB / 75°F WB	
		TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
40VMW	12	7.04	6.47	8.53	6.96	10.02	7.73	12.00	8.54	12.79	8.76	13.59	8.94
	15	8.80	8.21	10.66	8.82	12.52	9.79	15.00	10.82	15.99	11.11	16.98	11.36
	18	10.56	9.33	12.79	10.08	15.02	11.21	18.00	12.42	19.19	12.72	20.38	12.97
	24	14.08	11.88	17.06	12.90	20.03	14.38	24.00	15.98	25.59	16.33	27.17	16.60
	30	17.60	14.95	21.32	16.22	25.04	18.08	30.00	20.08	31.98	20.53	33.97	20.89
	36	21.12	19.95	25.59	21.38	30.05	23.75	36.00	26.23	38.38	26.96	40.76	27.58
	48	28.17	25.35	34.12	27.30	40.07	30.38	48.00	33.66	51.17	34.54	54.35	35.29

Rated Condition: Evaporation temperature is 42.8°F with high speed airflow.

Table 24 – Heating Capacity

Model	Unit Size	Indoor air temp.					
		61°F DB	64°F DB	67°F DB	70°F DB	73°F DB	75°F DB
		TC	TC	TC	TC	TC	TC
40VMW	12	15.13	14.58	14.04	13.50	12.60	11.99
	15	19.05	18.37	17.68	17.00	15.86	15.10
	18	23.53	22.69	21.84	21.00	19.59	18.66
	24	30.25	29.17	28.08	27.00	25.19	23.99
	30	38.10	36.73	35.37	34.00	31.72	30.21
	36	44.82	43.21	41.61	40.00	37.32	35.54
	48	60.51	58.34	56.17	54.00	50.38	47.97

Rated Condition: Condensation temperature is 114.8°F.

TC = Total capacity; KBTU/h

SC = Sensible capacity; KBTU/h