

Engineering Data Book



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UNDER CEILING/FLOOR UNIT BASIC INFORMATION

External Appearance



Fig. 1 —40VMU012/015/018/024---3



Fig. 2 —40VMU030---3



Fig. 3 —40VMU036/048---3

Specifications

Table 1 —Data Table

MODEL			40VMU012---3	40VMU015---3
Power Supply			208/230V-1Ph-60Hz	
Total Cooling Capacity*1	Btu/h		12,000	15,000
Sensible Cooling Capacity*1	Btu/h		8,540	10,820
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	dBA	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 stranded shielded cable 18AWG	

NOTES:

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

Cooling: Outdoor air temperature 80°F (27°C) DB / 67°F (20°C) WB; Outdoor 95°F (35°C) DB

Heating: Indoor air temperature 70°F (21°C) DB / Outdoor air temperature 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
Total Cooling Capacity*1		Btu/h	18,000	24,000
Sensible Cooling Capacity*1		Btu/h	12,420	15,980
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 stranded shielded cable 18AWG	

NOTES:

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

Cooling: Outdoor air temperature 80°F (27°C) DB / 67°F (20°C) WB; Outdoor 95°F (35°C) DB

Heating: Indoor air temperature 70°F (21°C) DB / Outdoor air temperature 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	
Total Cooling Capacity*1	Btu/h		30,000	36,000
Sensible Cooling Capacity*1	Btu/h		20,080	26,230
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	dBA	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 stranded shielded cable 18AWG	

NOTES:

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

Cooling: Outdoor air temperature 80°F (27°C) DB / 67°F (20°C) WB; Outdoor 95°F (35°C) DB

Heating: Indoor air temperature 70°F (21°C) DB / Outdoor air temperature 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
Total Cooling Capacity*1	Btu/h		48,000
Sensible Cooling Capacity*1	Btu/h		33,660
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 stranded shielded cable 18AWG

NOTE:

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

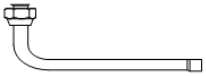
Cooling: Outdoor air temperature 80°F (27°C) DB / 67°F (20°C) WB; Outdoor 95°F (35°C) DB

Heating: Indoor air temperature 70°F (21°C) DB / Outdoor air temperature 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).

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 side of the unit
Liquid side copper pipe (for 012-024 only)	1		
Gas side copper pipe	1		For routing refrigerant pipes to side of the unit
Liquid side copper pipe	1		For routing refrigerant pipes to rear or bottom of the unit
Bolt assembly	4		---

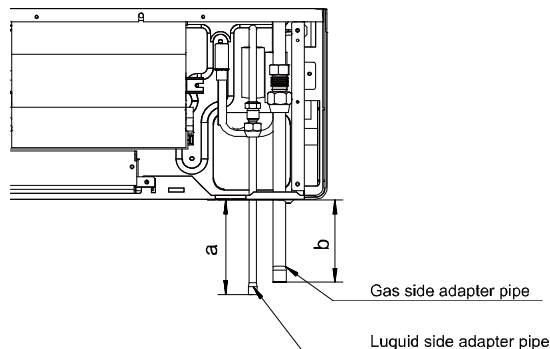


Fig. 4 —Under Connection

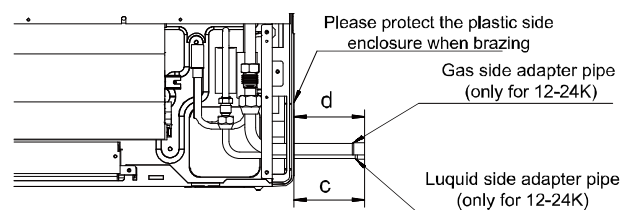


Fig. 5 —Side Connection

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	-

PIPING DIAGRAM

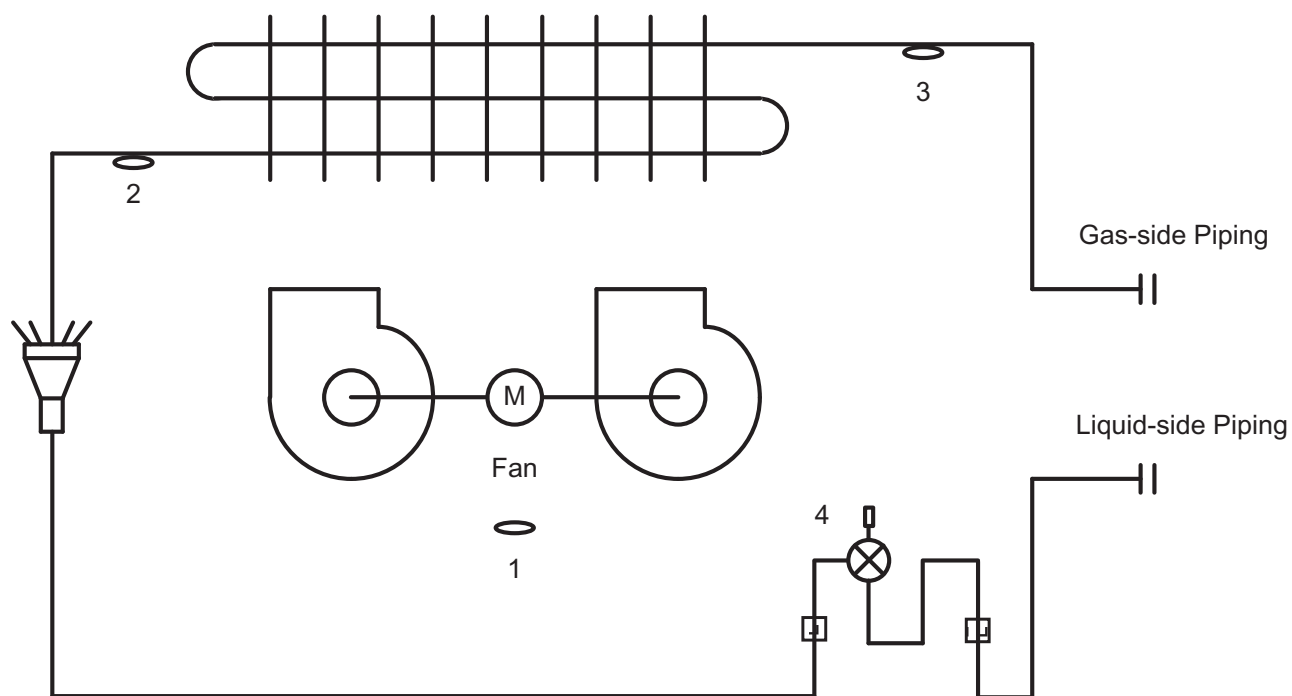


Fig. 6 —Piping

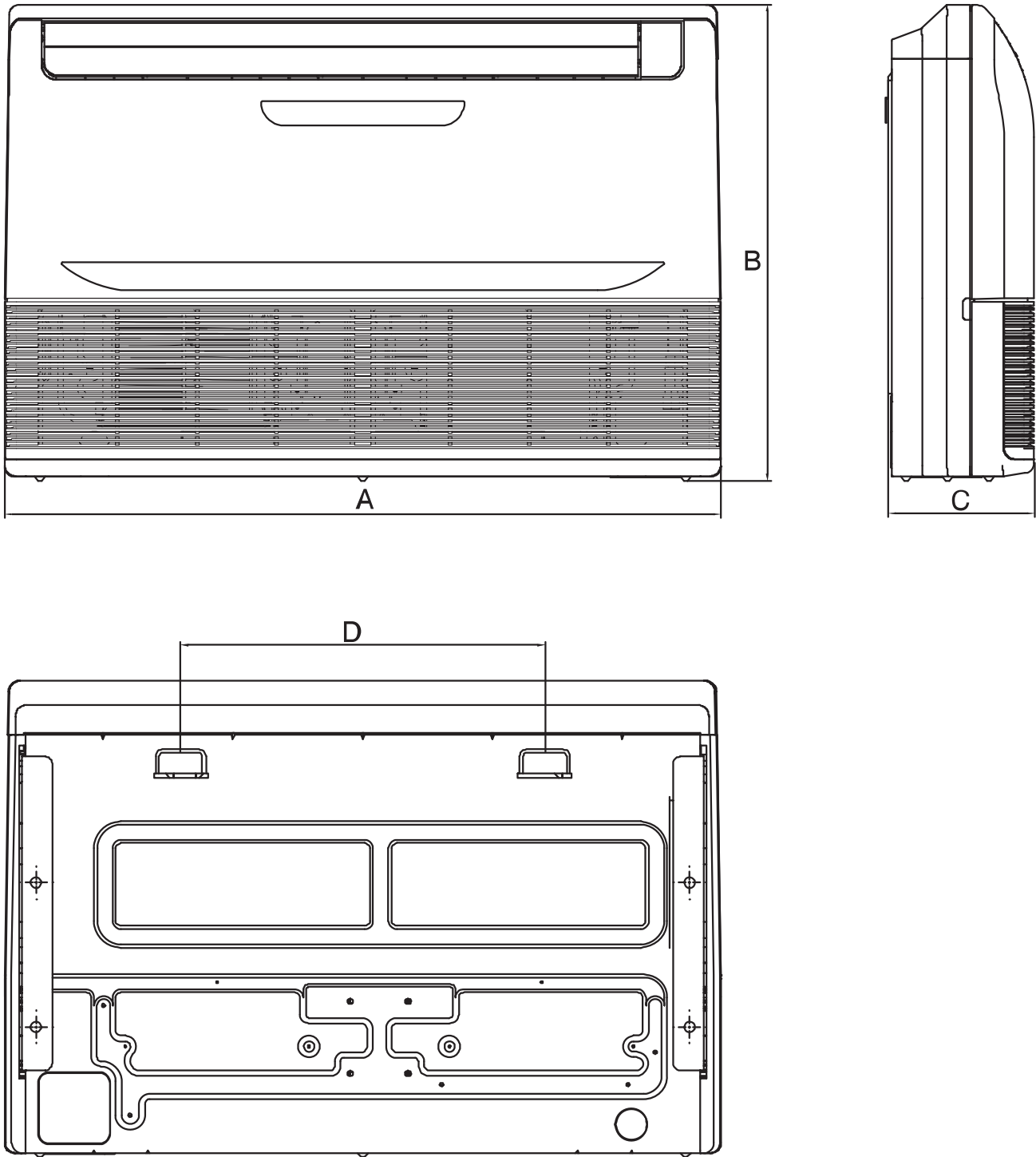
Table 6 —Piping

NUMBER	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 7 —Gas / Liquid Line Sizes

MODEL	GAS	LIQUID
40VMU012/015---3	1/2	1/4
40VMU018/024/030/036/048---3	5/8	3/8

DIMENSIONS



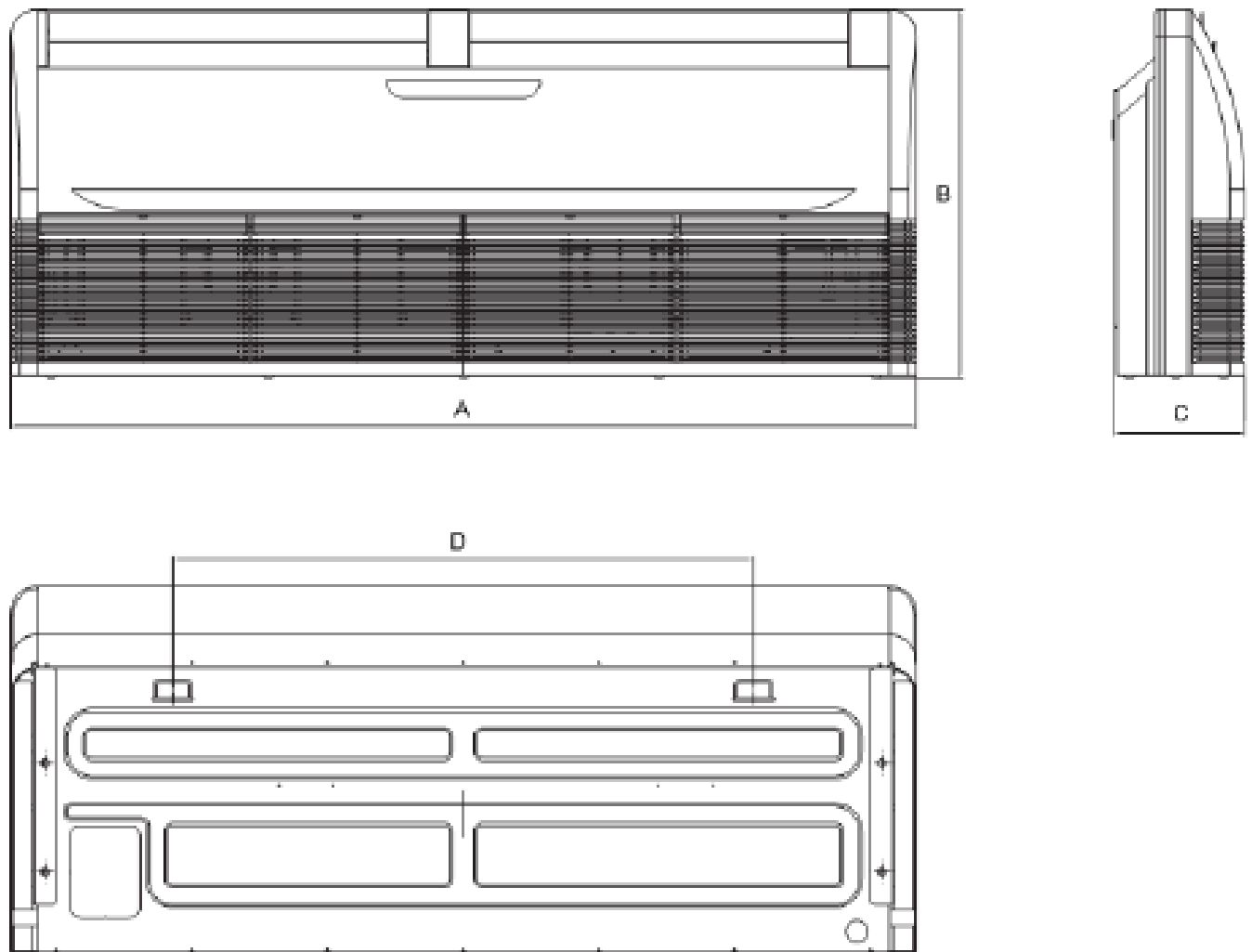
NOTE: All dimensions are shown in inches.

Fig. 7 —40VMU012/015/018/024/030---3

Table 8 —Dimensions (40VMU012/015/018/024/030---3)

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

DIMENSIONS (CONT.)



NOTE: All dimensions are shown in inches.

Fig. 8 —40VMU036/048

Table 9 —Dimensions (036/048)

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

WIRING DIAGRAM

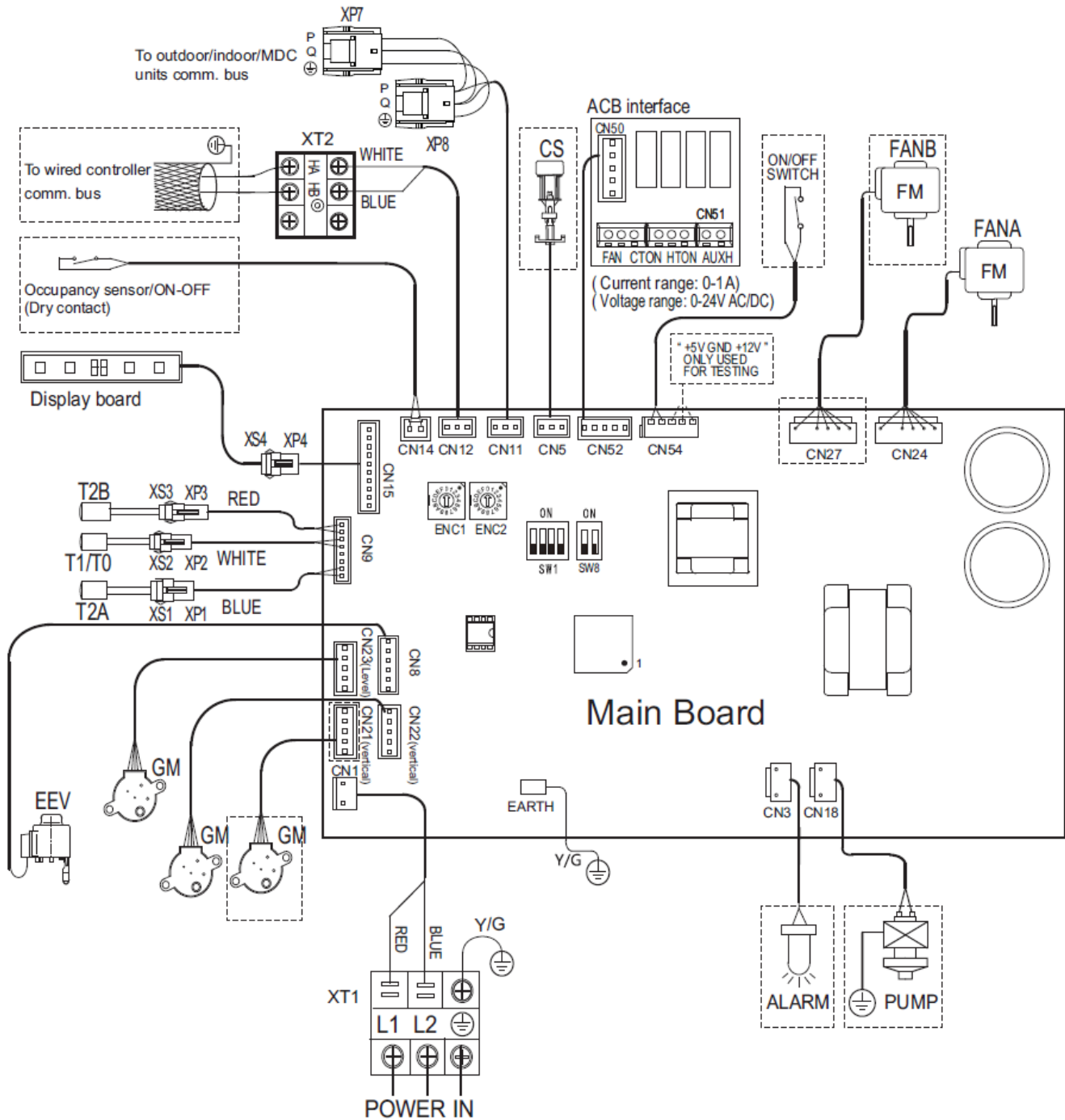


Fig. 9 —40VMU All Models

40VMU012---3 to 40VMU048---3 Wiring Diagram Definitions and Settings

Table 10 —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 expansion valve
XP1-8	Connectors
XS1-4	
XT1-2	Terminal
PUMP	Pump motor
CS	Condensate switch
GM	Swing motor

Table 12 —ENC1 Definition

	(Reserved)
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Table 14 —SW1 Definition

	0 means auto addressing mode (Default)
	1 means factory test mode (Default)
	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 16 —ENC2 Definitions

	Reserved
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Table 11 —Error Codes

ERROR CODE	ERROR 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 first powered on

Table 13 —J1 Definition

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

Table 15 —SW8 Definitions

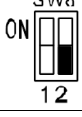
	Reserved
	Reserved

Table 17 —0/1 Definition

	Means 0
	Means 1

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)
kW: Fan Motor Rated Output (kW)
FLA: Full Load Amps (A)
IFM: Indoor Fan Motor

SYMBOLS:

AIR THROW CHARTS

40VMU012---3

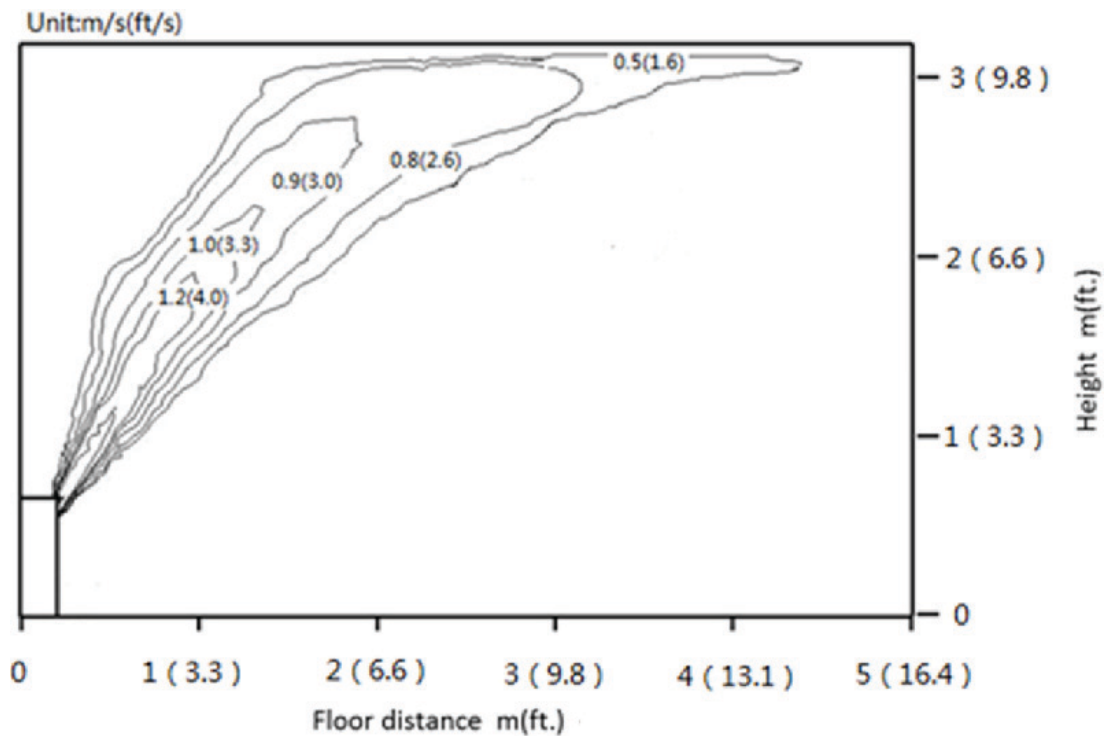


Fig. 10 —Cooling mode with 60° swing

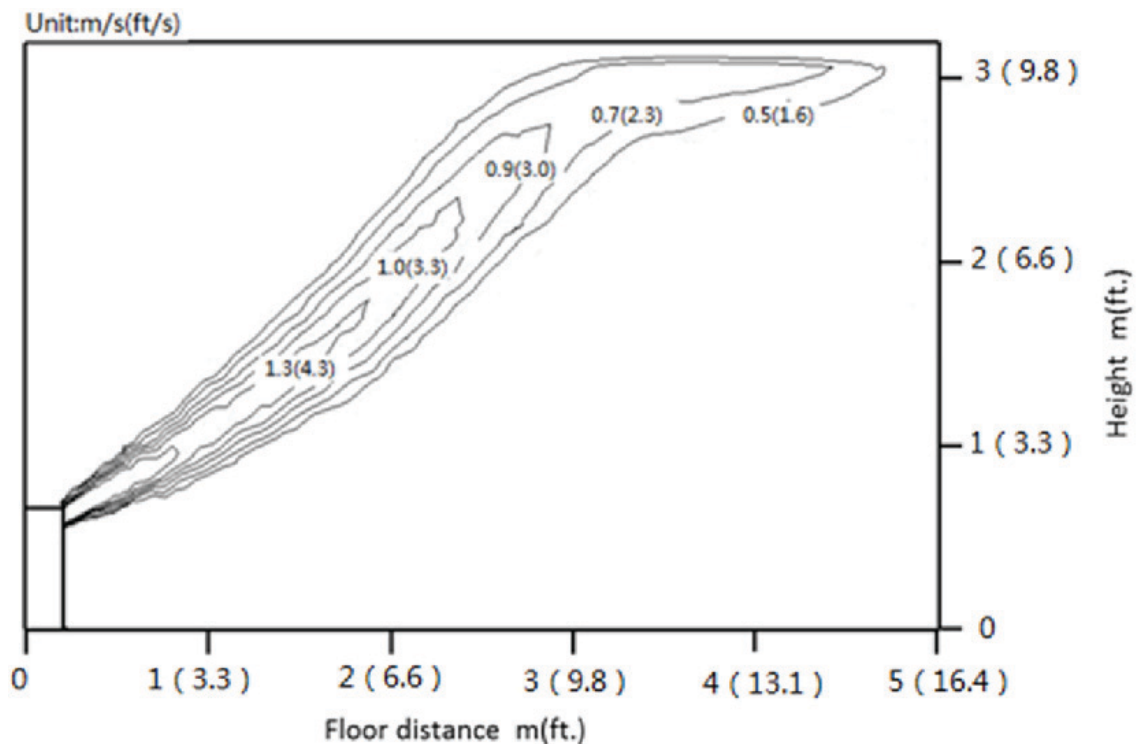


Fig. 11 —Heating mode with 60° swing

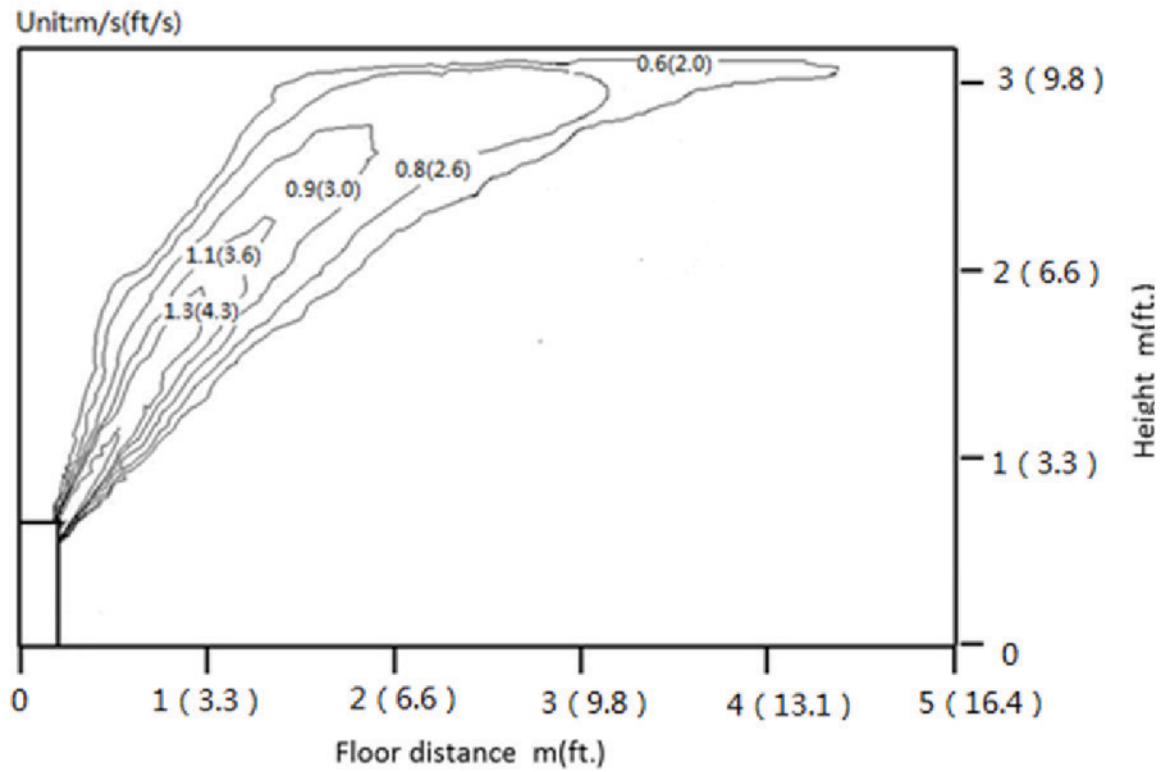


Fig. 12 —Cooling mode with 60° swing

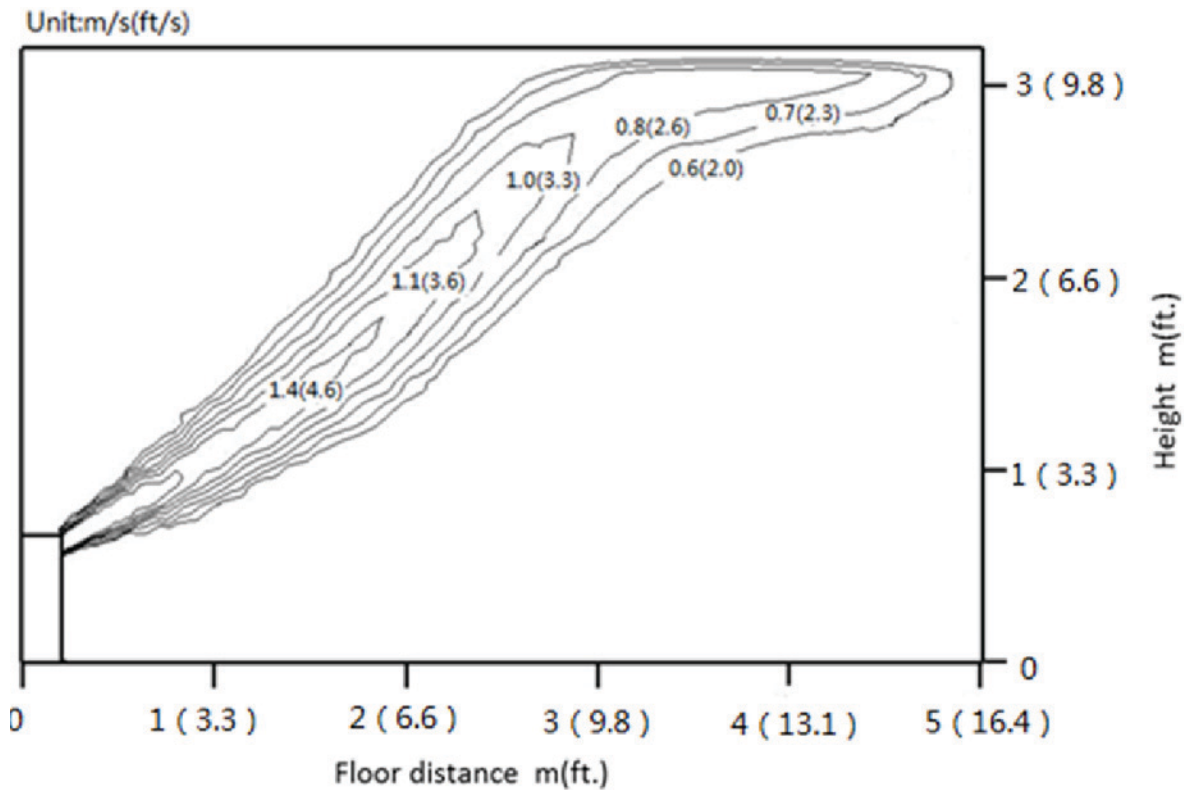


Fig. 13 —Heating mode with 60° swing

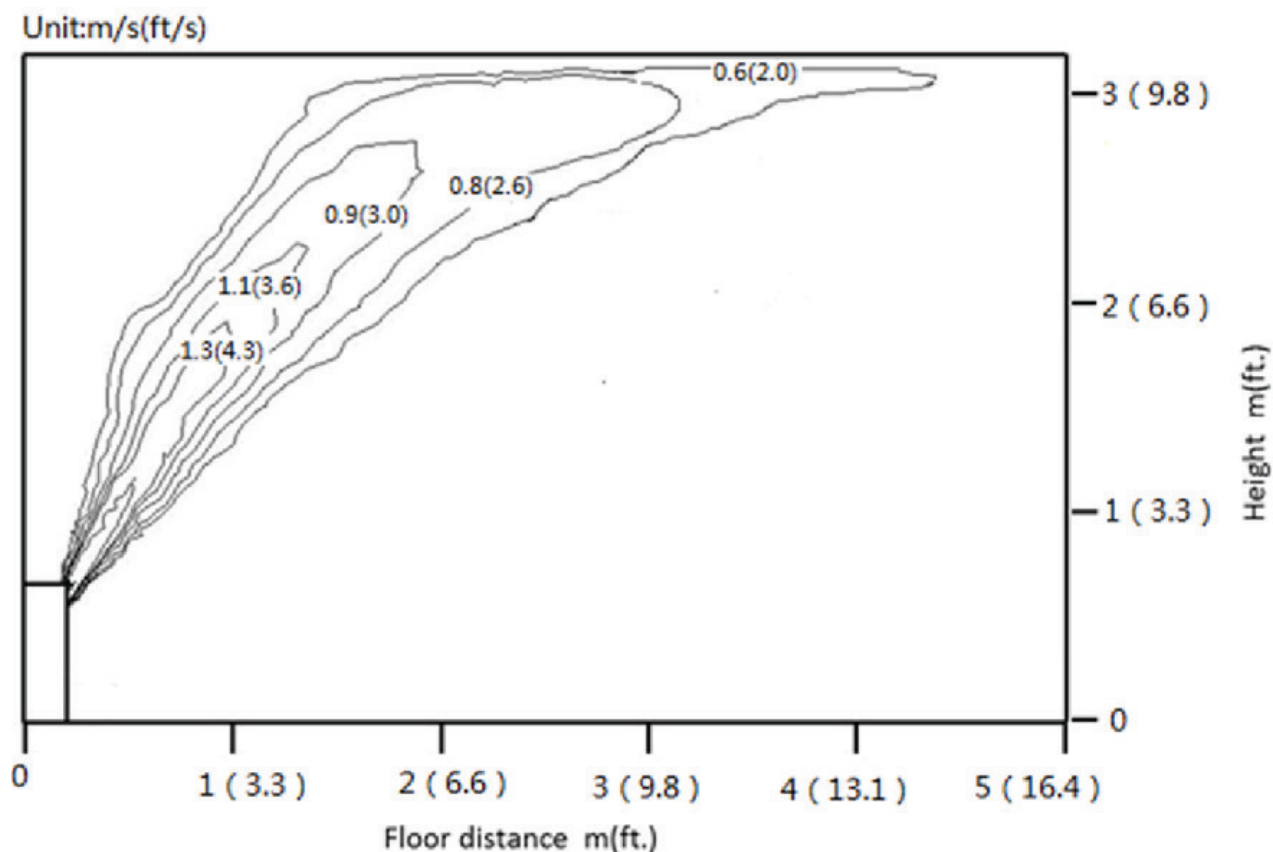


Fig. 14 —Cooling mode with 60° swing

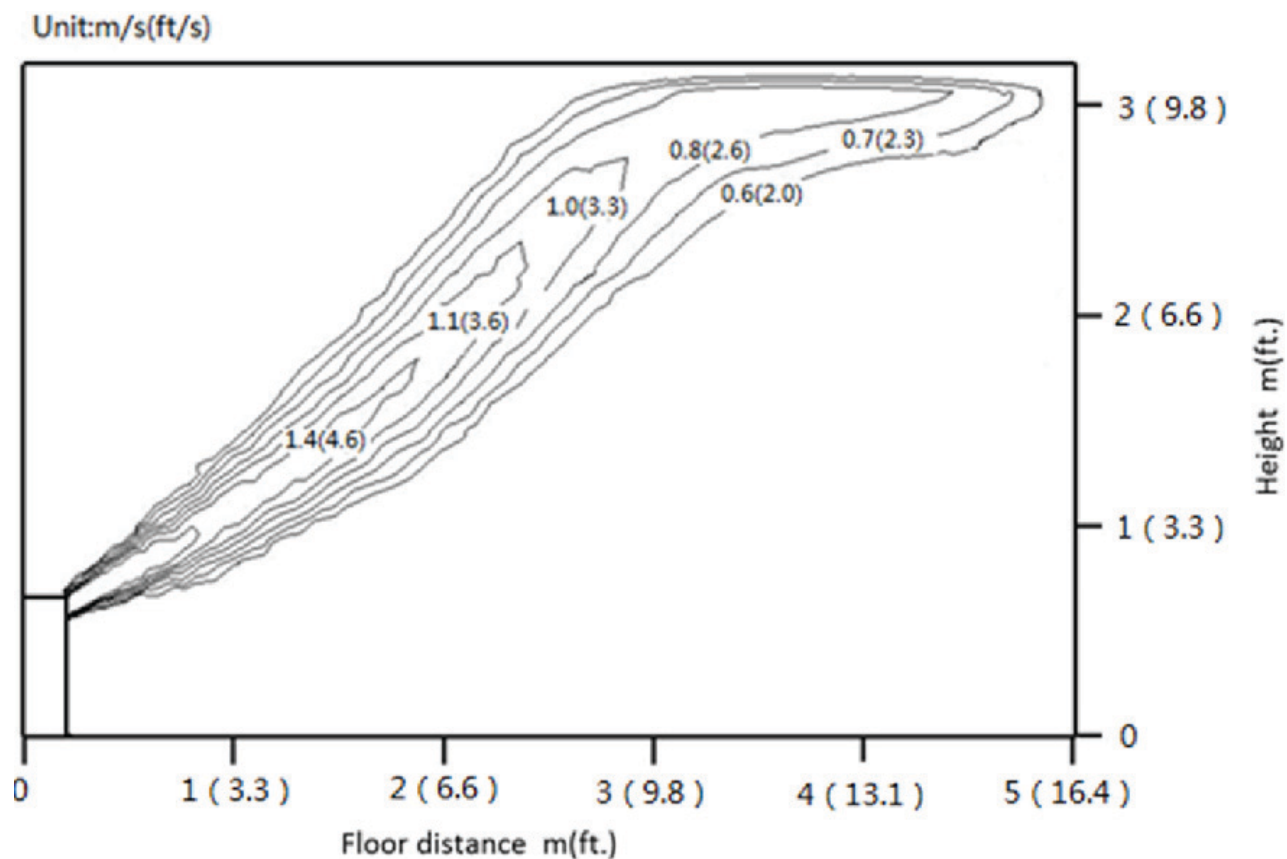


Fig. 15 —Heating mode with 60° swing

Unit:m/s(ft/s)

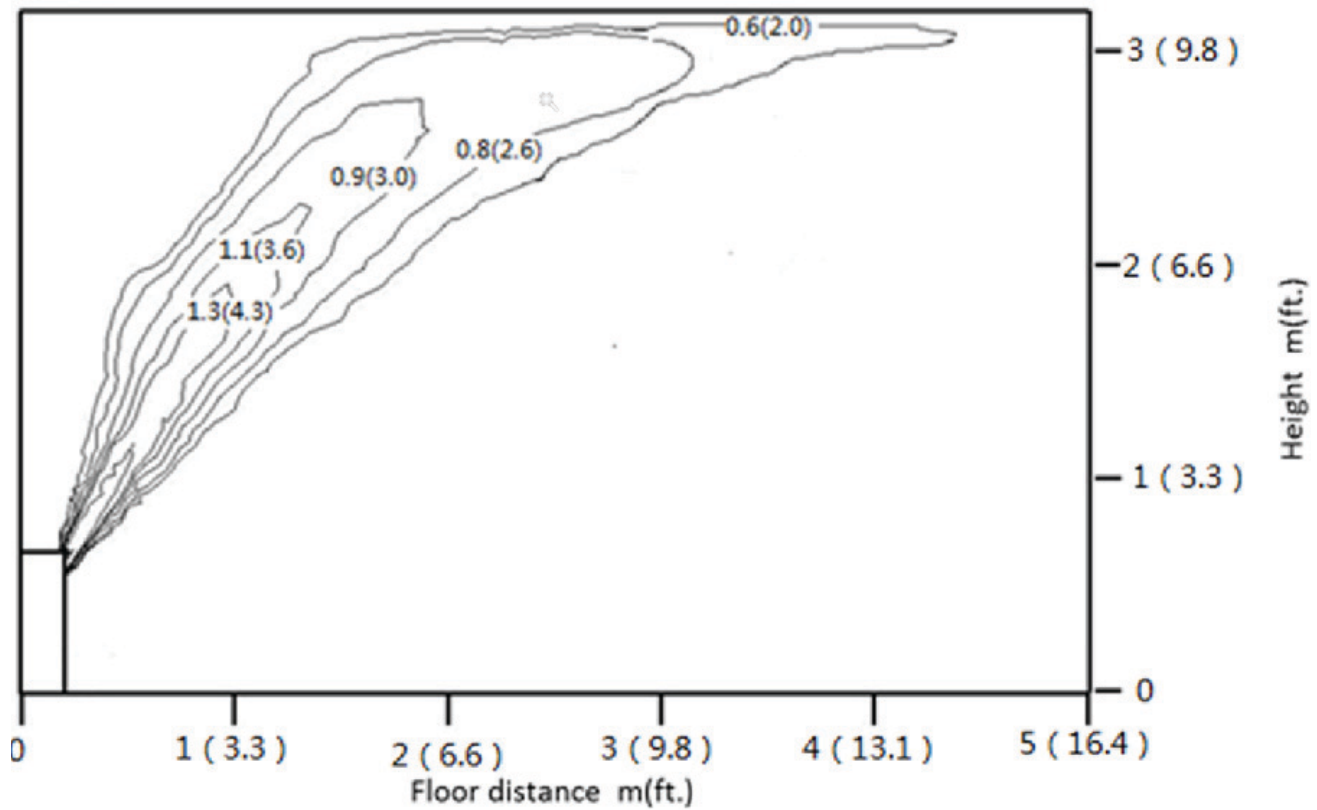


Fig. 16 —Cooling mode with 60° swing

Unit:m/s(ft/s)

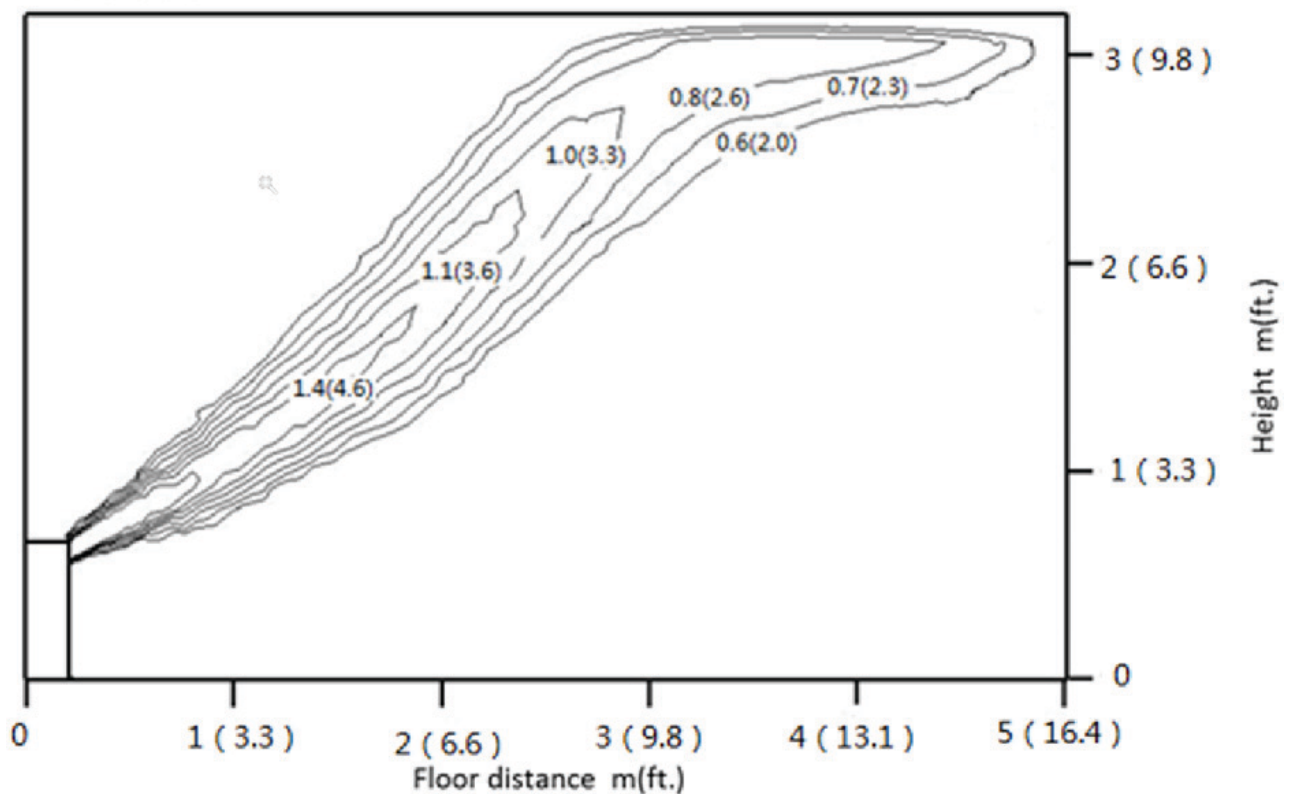


Fig. 17 —Heating mode with 60° swing

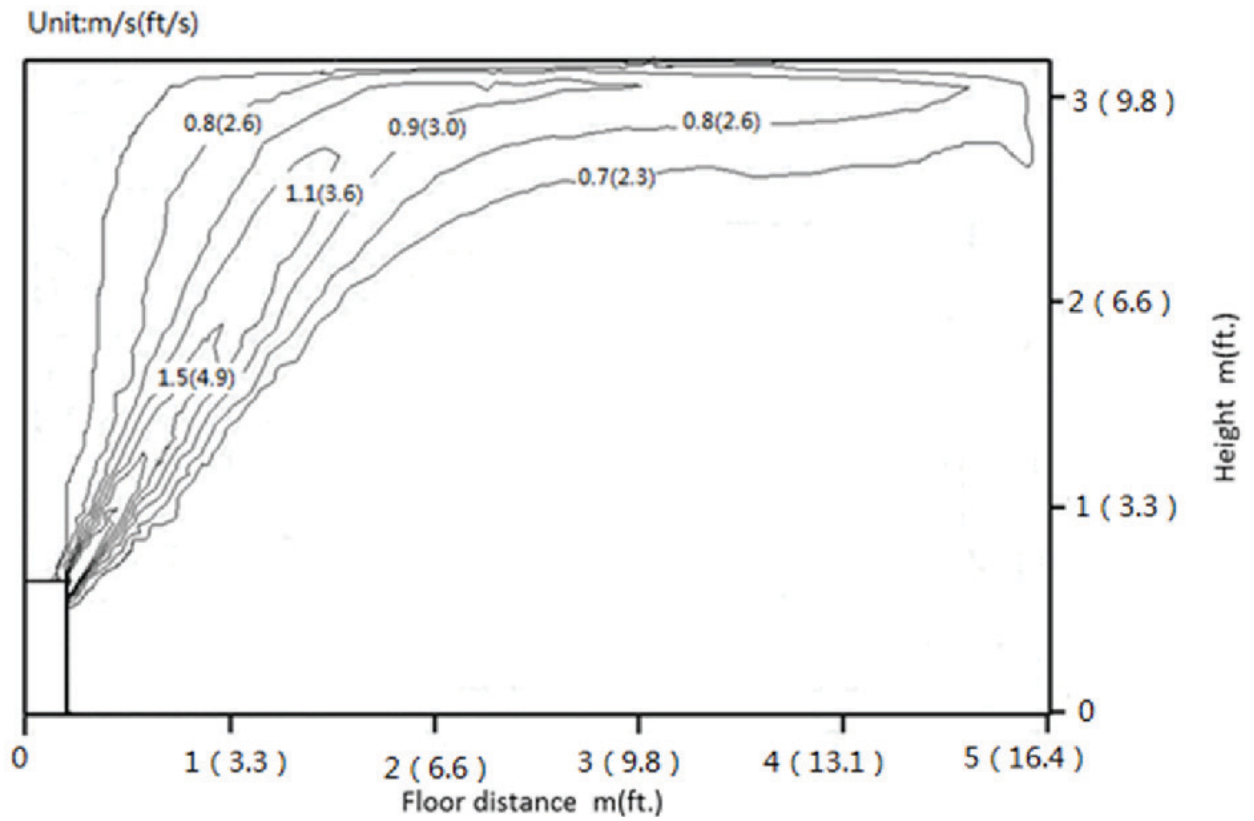


Fig. 18 —Cooling mode with 60° swing

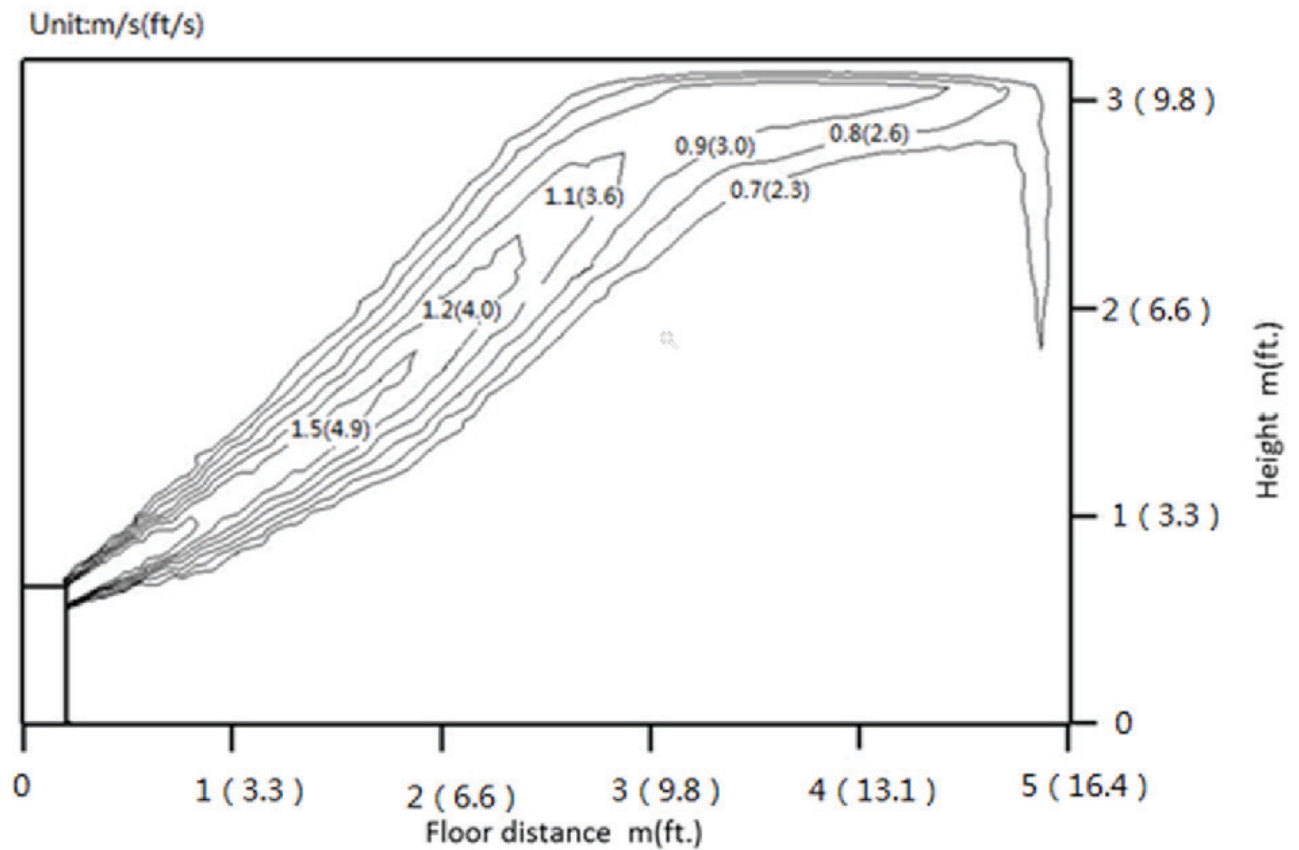


Fig. 19 —Heating mode with 60° swing

Unit:m/s(ft/s)

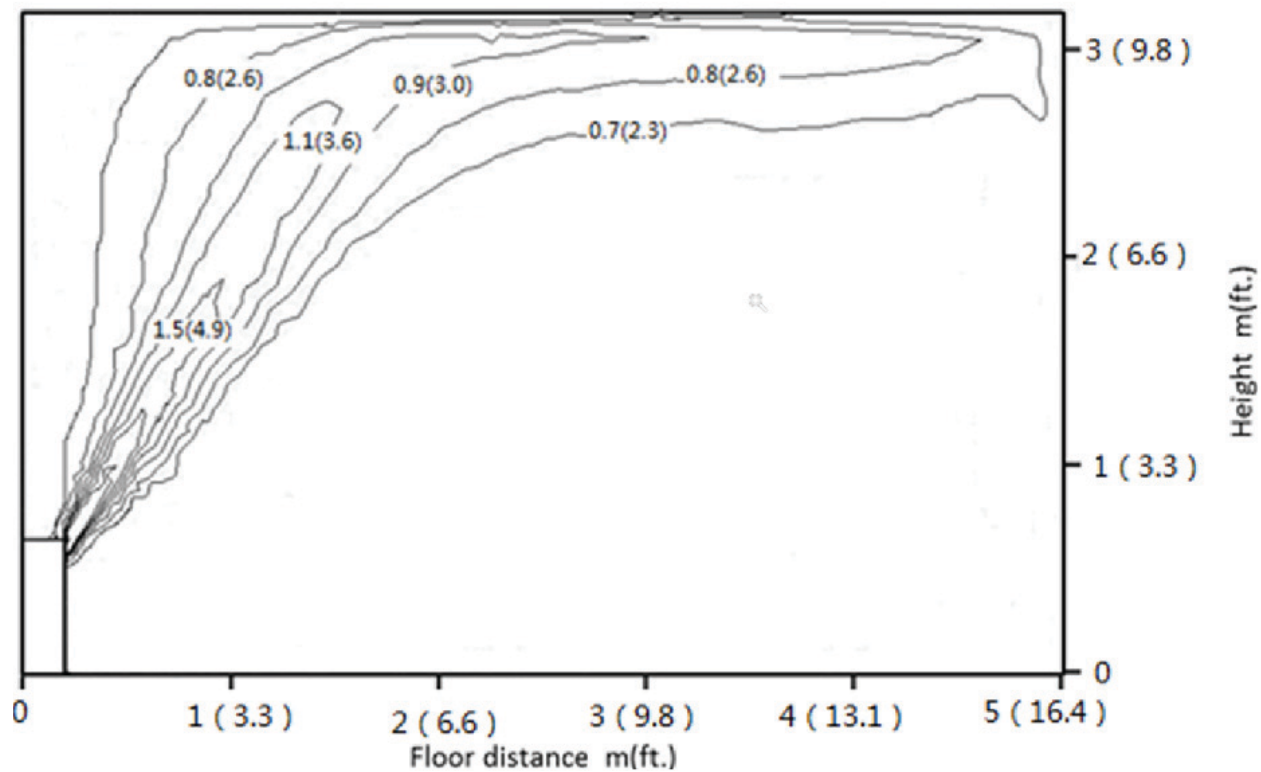


Fig. 20 —Cooling mode with 60° swing

Unit:m/s(ft/s)

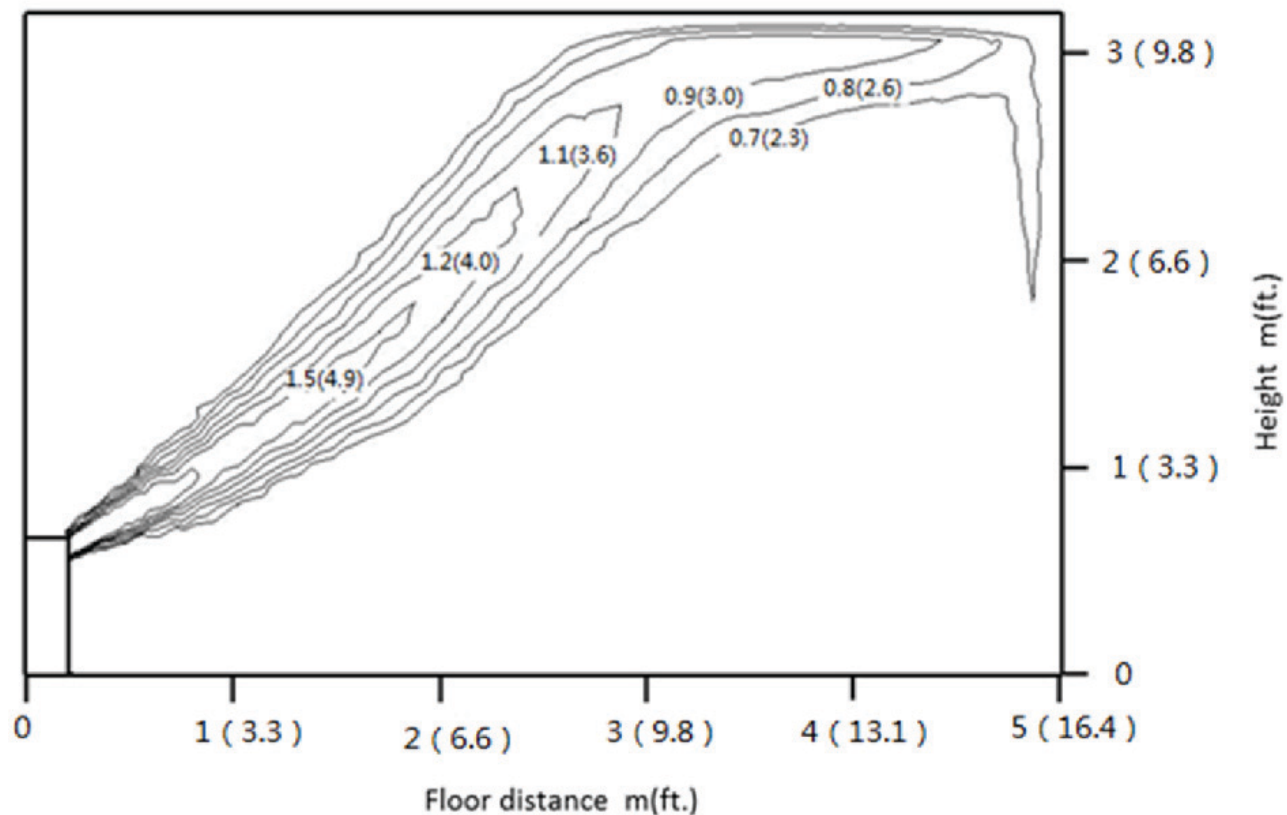


Fig. 21 —Heating mode with 60° swing

Unit:m/s(ft/s)

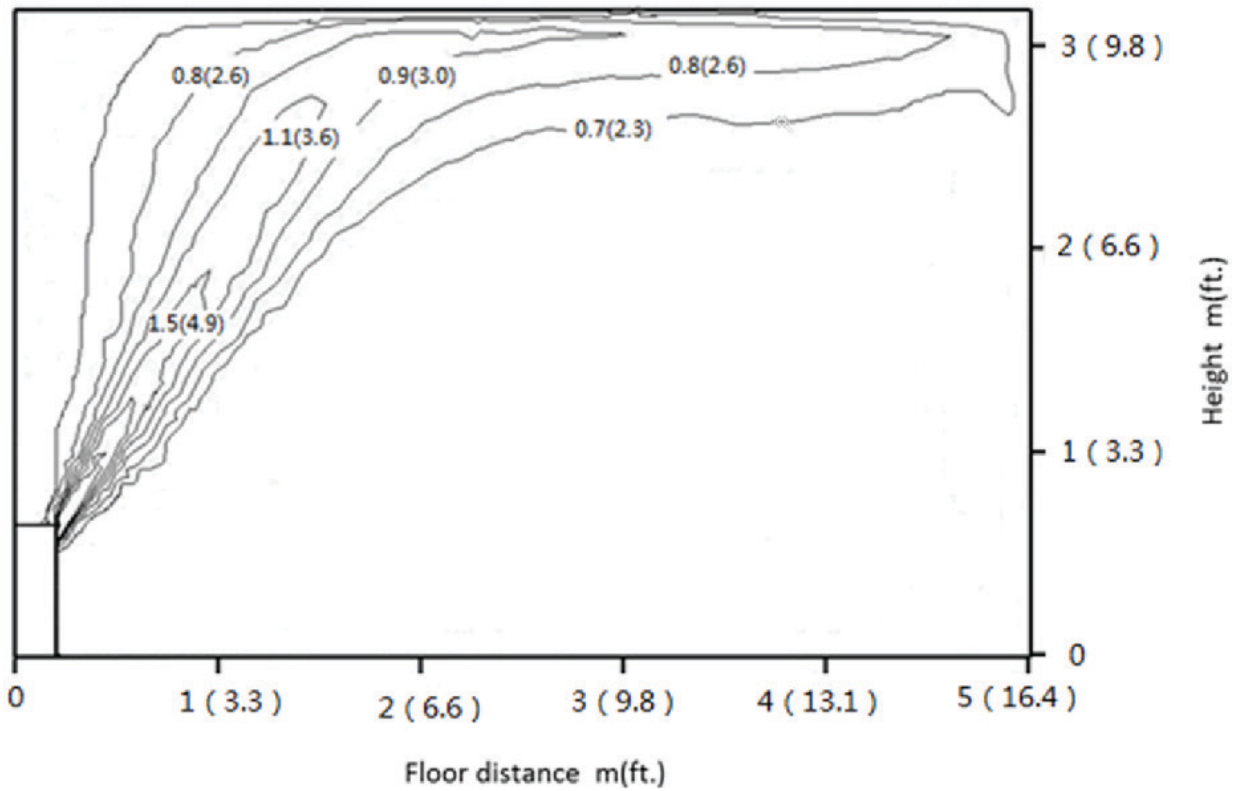


Fig. 22 —Cooling mode with 60° swing

Unit:m/s(ft/s)

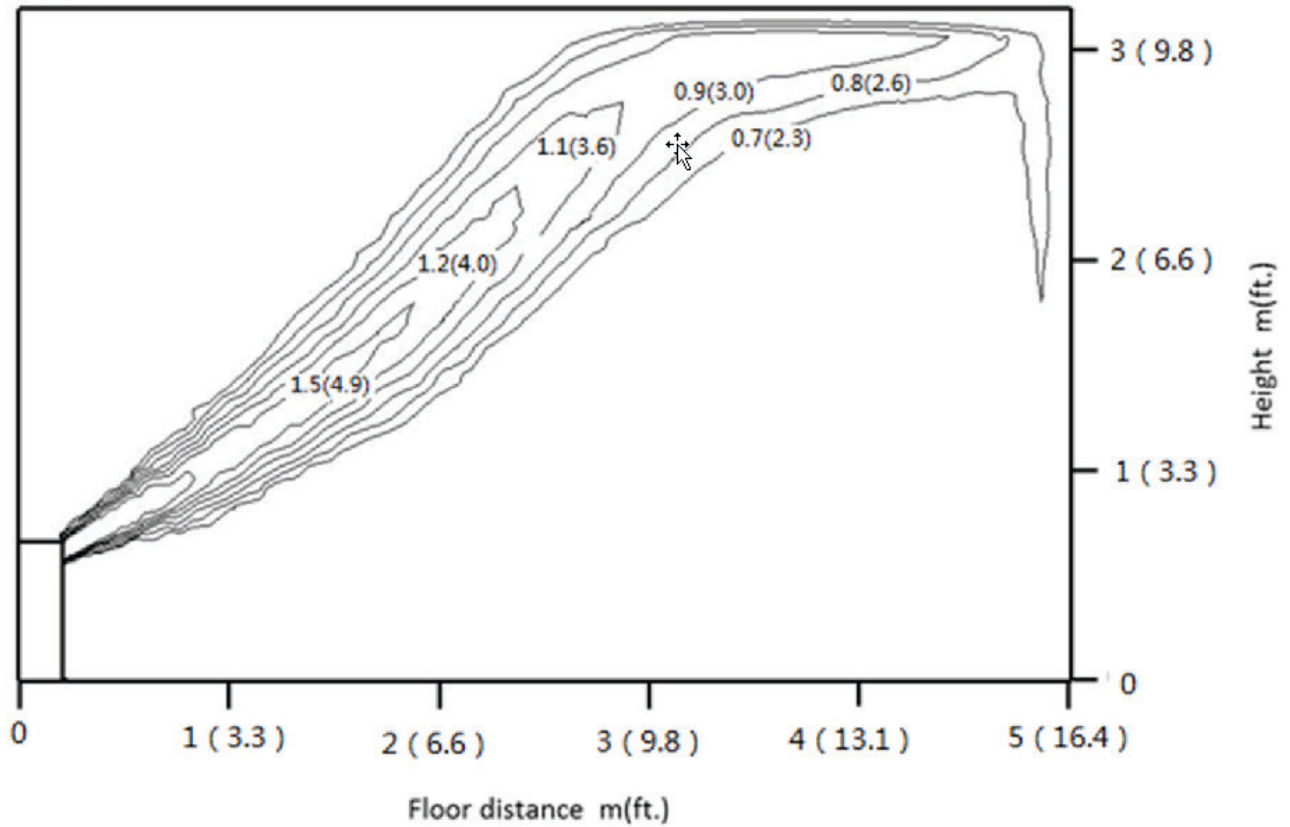


Fig. 23 —Heating mode with 60° swing

SOUND DATA

Sound Pressure Levels

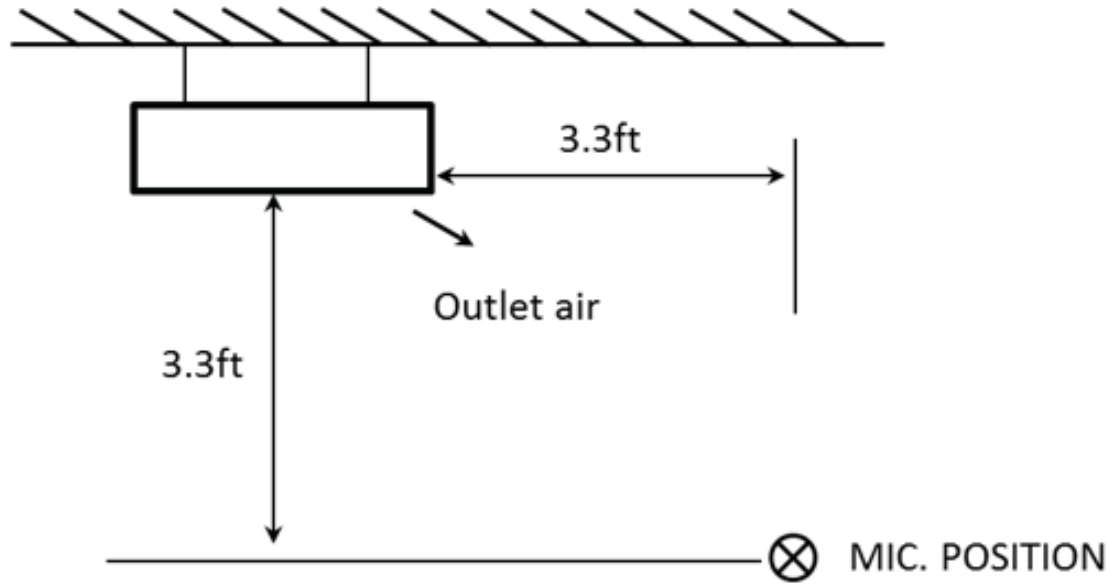


Fig. 24 —Overall Sound Levels

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 in dBA

Floor Installation

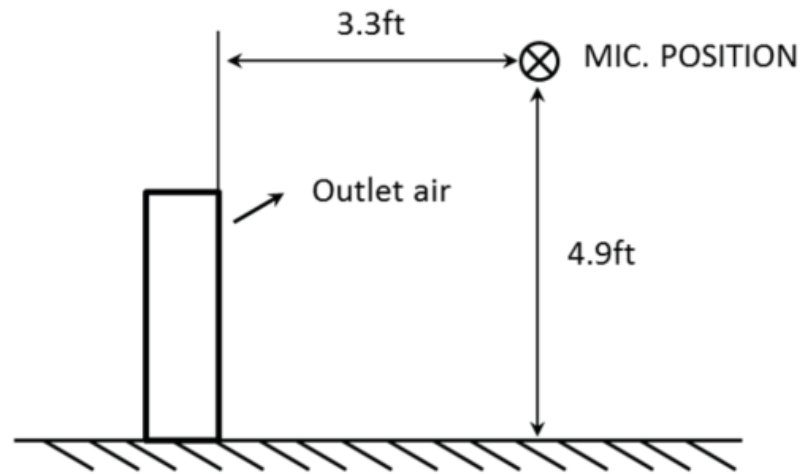


Fig. 25 —Floor Installation

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

NC Curves

NOTES:

External Static Pressure: 0 in. (0 Pa)

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

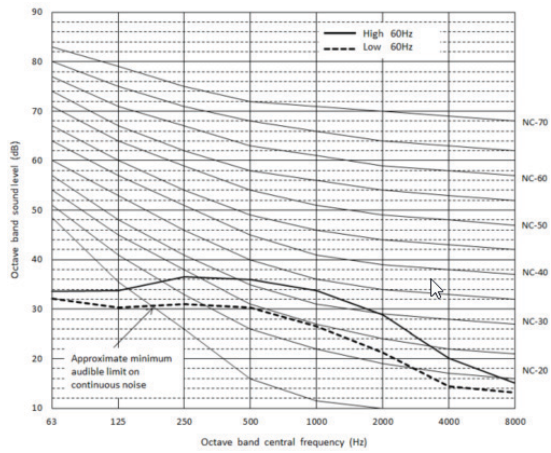


Fig. 26 —40VMU012---3

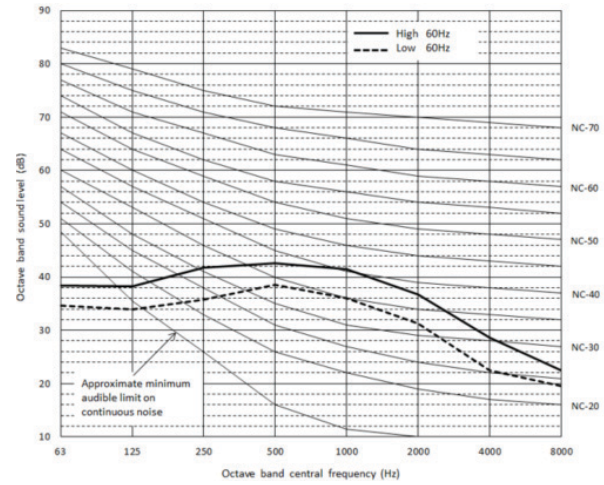


Fig. 27 —40VMU015---3

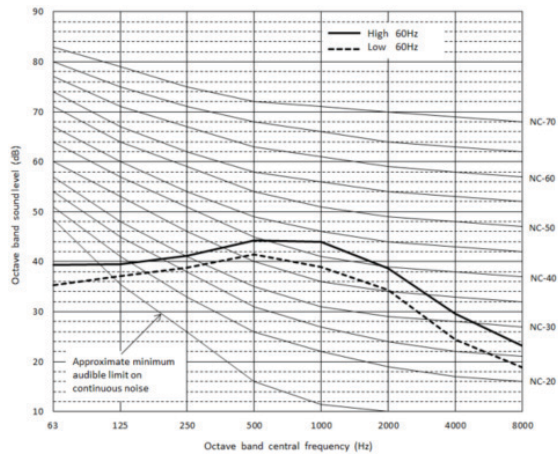


Fig. 28 —40VMU018---3

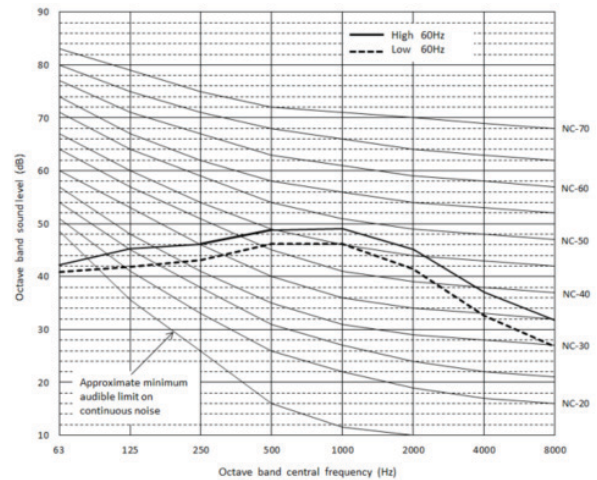


Fig. 29 —40VMU024---3

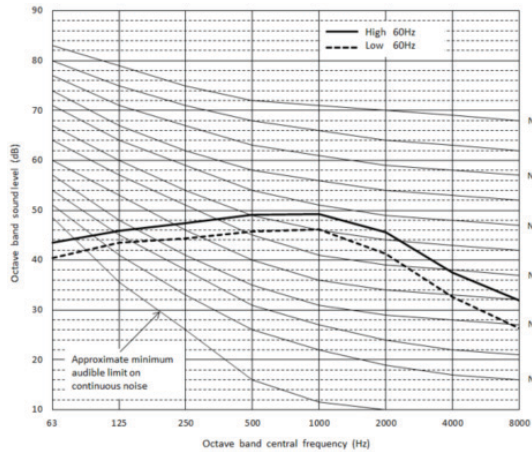


Fig. 30 —40VMU030---3

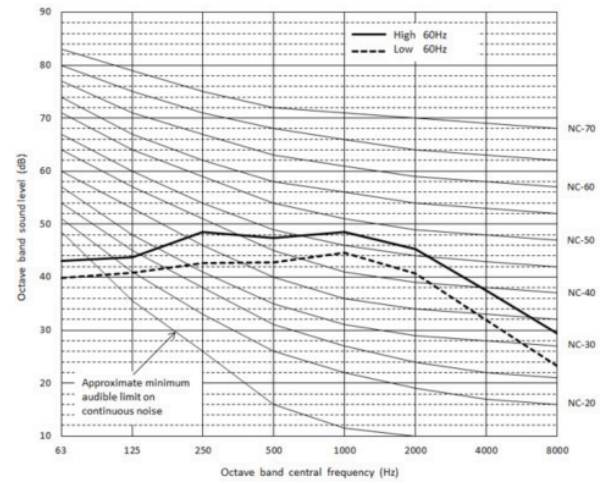


Fig. 31 —40VMU036---3

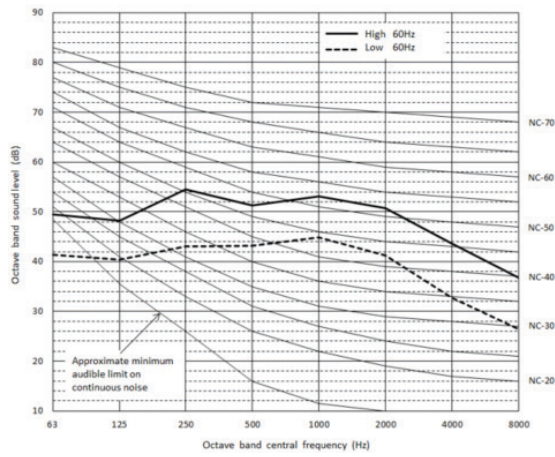


Fig. 32 —40VMU048---3

CAPACITY DATA TABLES

Table 23 —Cooling Capacity

INDOOR UNIT ENTERING AIR CONDITIONS:		COOLING CAPACITY INDICATION													
		12K		15K		18K		24K		30K		36K		48K	
drybulb(°F)	wetbulb(°F)	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
70	58	7.54	6.22	9.42	7.86	11.31	9.03	15.07	11.55	18.84	14.56	22.61	19.02	30.15	24.39
70	62	9.52	5.85	11.9	7.32	14.28	8.6	19.04	11.21	23.8	14.06	28.56	17.59	38.08	22.88
70	67	12	5.25	15	6.46	18	7.85	24	10.5	30	13.08	36	15.37	48	20.41
70	72	/	/	/	/	/	/	/	/	/	/	/	/	/	/
70	76	/	/	/	/	/	/	/	/	/	/	/	/	/	/
75	58	7.59	7.52	9.49	9.42	11.39	10.84	15.18	13.75	18.97	17.37	22.77	22.61	30.36	29.61
75	62	9.59	7.15	11.98	9.02	14.38	10.41	19.17	13.41	23.97	16.87	28.76	21.81	38.35	28.09
75	67	12.08	6.54	15.11	8.16	18.13	9.65	24.17	12.69	30.21	15.89	36.25	19.57	48.34	25.61
75	72	12.99	5.10	16.24	6.27	19.49	7.63	25.98	10.22	32.48	12.74	38.98	14.92	51.97	19.83
75	76	/	/	/	/	/	/	/	/	/	/	/	/	/	/
80	58	7.65	7.54	9.55	9.42	11.47	11.31	15.28	15.07	19.10	18.84	22.93	22.61	30.57	30.15
80	62	9.65	8.44	12.07	10.72	14.48	12.23	19.31	15.61	24.13	19.68	28.96	26.04	38.61	33.32
80	67	12.17	7.83	15.21	9.86	18.25	11.47	24.34	14.89	30.42	18.69	36.51	23.79	48.67	30.82
80	72	13.08	6.39	16.35	7.97	19.63	9.44	26.16	12.42	32.71	15.54	39.25	19.13	52.33	25.04
80	76	13.79	5.20	17.23	6.41	20.68	7.76	27.57	10.36	34.46	12.92	41.36	15.28	55.14	20.25
85	58	7.70	7.54	9.62	9.42	11.55	11.31	15.39	15.07	19.24	18.84	23.09	22.61	30.79	30.15
85	62	9.72	9.52	12.15	11.90	14.58	14.28	19.44	19.04	24.30	23.80	29.16	28.56	38.89	38.08
85	67	12.25	9.12	15.32	11.56	18.38	13.28	24.51	17.09	30.63	21.51	36.76	28.02	49.02	36.05
85	72	13.17	7.68	16.47	9.67	19.76	11.26	26.34	14.61	32.94	18.35	39.53	23.35	52.70	30.25
85	76	13.89	6.49	17.35	8.11	20.82	9.57	27.76	12.56	34.70	15.73	41.65	19.50	55.53	25.46
90	58	7.75	7.54	9.69	9.42	11.63	11.31	15.50	15.07	19.37	18.84	23.25	22.61	31.00	30.15
90	62	9.79	9.52	12.24	11.90	14.68	14.28	19.58	19.04	24.47	23.80	29.37	28.56	39.16	38.08
90	67	12.34	12.00	15.42	15.00	18.51	18.00	24.68	24.00	30.85	30.00	37.02	36.00	49.36	48.00
90	72	13.26	8.98	16.58	11.38	19.90	13.07	26.53	16.82	33.17	21.17	39.80	27.58	53.07	35.48
90	76	13.98	7.79	17.47	9.82	20.97	11.39	27.96	14.75	34.94	18.54	41.94	23.73	55.91	30.68

Table 24 —Heating Capacity

MODEL	CAPACITY INDICATION	HEATING INDOOR AIR TEMPERATURE							
		61 °FDB	64 °FDB	67 °FDB	70 °FDB	73 °FDB	75 °FDB	77 °FDB	80 °FDB
		TC	TC	TC	TC	TC	TC	TC	TC
40VMU	12	14.31	14.04	13.77	13.50	12.60	11.99	11.39	10.49
	15	18.02	17.68	17.34	17.00	15.86	15.10	14.34	13.21
	18	22.27	21.84	21.42	21.00	19.59	18.66	17.72	16.31
	24	28.63	28.08	27.54	27.00	25.19	23.99	22.78	20.97
	30	36.05	35.37	34.68	34.00	31.72	30.21	28.69	26.41
	36	42.41	41.61	40.80	40.00	37.32	35.54	33.75	31.07
	48	57.25	56.17	55.08	54.00	50.38	47.97	45.56	41.95

Rated Condition: Condensation temperature is 114.8°F.

TC = Total capacity; KBTU/h

SC = Sensible capacity; KBTU/h