

Engineering Data Book



TABLE OF CONTENTS

4-WAY CASSETTE BASIC INFORMATION.....3

 Specifications.....3

 Accessories.....7

PIPING DIAGRAM..... 8

DIMENSIONS.....9

WIRING DIAGRAM.....10

ELECTRICAL CHARACTERISTICS.....12

AIR THROW CHARTS.....13

SOUND DATA.....21

 Sound Pressure Levels.....21

 NC Curves.....22

CAPACITY DATA TABLES.....24

4-WAY CASSETTE BASIC INFORMATION

Specifications

Table 1 —Data Table

MODEL		40VMF009A--3	40VMF012A--3
Power Supply	V/Ph/Hz	208/230-1-60	
Total Cooling Capacity *1	Btu/h	9,000	12,000
Sensible Cooling Capacity *1	Btu/h	8,620	10,880
Heating Capacity *1	Btu/h	10,000	13,500
MCA	A	0.73	0.91
MOCP	A	15	
Panel / Grille		40VMF001----	
Filter		Installed in Panel / Grille	
Dimensions of Unit (H x W x D)	in.	9 x 33-1/8 x 33-1/8	
Dimensions of Panel / Grille (H x W x D)	in.	1-3/4 x 37-3/8 x 37-3/8	
Net Unit Weight	lbs	54	
Net Panel / Grille Weight	1bs	13.2	
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	460/390/330
	Sound Pressure Level (H/M/L)*2	dB(A)	36.7/34.0/32.1
	Motor Input	W	40
Min. External Static Pressure (Factory Setting)		in. WG	0
Max. External Static Pressure		in. WG	0.12
Piping Connections	Gas (Low) Pressure	in.	1/2
	Liquid (High) Pressure	in.	1/4
	Condensate	in.	1-1/4
Condensate Lift	in.	29-1/2	
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 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 4.6 feet below the unit.

Table 2 —Data Table

MODEL			40VMF015A--3	40VMF018A--3
Power Supply		V/Ph/Hz	208/230-1-60	
Total Cooling Capacity *1		Btu/h	15,000	18,000
Sensible Cooling Capacity *1		Btu/h	13,370	18,220
Heating Capacity *1		Btu/h	17,000	21,000
MCA		A	1.1	2.0
MOCP		A	15	
Panel / Grille			40VMF001----	
Filter			Installed in Panel / Grille	
Dimensions of Unit (H x W x D)		in.	9 x 33-1/8 x 33-1/8	11-3/4 x 33-1/8 x 33-1/8
Dimensions of Panel / Grille (H x W x D)		in.	1-3/4 x 37-3/8 x 37-3/8	
Net Unit Weight		lbs	54.0	69.0
Net Panel / Grille Weight		lbs	13.2	
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	680/560/460	1000/700/610
	Sound Pressure Level (H/M/L)*2	dBA	45.6/41.5/37.0	52.5/43.1/40.2
	Motor Input	W	67	153.5
Min. External Static Pressure (Factory Setting)		in. WG	0	
Max. External Static Pressure		in. WG	0.12	
Piping connections	Gas (Low) Pressure	in.	1/2	5/8
	Liquid (High) Pressure	in.	1/4	3/8
	Condensate	in.	1-1/4	
Condensate Lift		in.	29-1/2	
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	

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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 4.6 feet below the unit.

Table 3 —Data Table

MODEL			40VMF024A--3	40VMF030A--3
Power Supply	V/Ph/Hz		208/230-1-60	
Total Cooling Capacity *1	Btu/h		24,000	30,000
Sensible Cooling Capacity *1	Btu/h		18,350	22,330
Heating Capacity *1	Btu/h		27,000	34,000
MCA	A		1.3	1.7
MOCP	A		15	
Panel / Grille			40VMF001----	
Filter			Installed in Panel / Grille	
Dimensions of Unit (H x W x D)	in.		11-3/4 x 33-1/8 x 33-1/8	
Dimensions of Panel / Grille (H x W x D)	in.		1-3/4 x 37-3/8 x 37-3/8	
Net Unit Weight	lbs		69.0	
Net Panel / Grille Weight	lbs		13.2	
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	800/700/610	950/800/680
	Sound Pressure Level (H/M/L)*2	dBA	44.7/42.5/40.2	49.5/45.1/42.1
	Motor Input	W	85.4	131.7
Min. External Static Pressure (Factory Setting)	in. WG		0	
Max. External Static Pressure	in. WG		0.12	
Piping connections	Gas (Low) Pressure	in.	5/8	
	Liquid (High) Pressure	in.	3/8	
	Condensate	in.	1-1/4	
Condensate Lift	in.		29-1/2	
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	

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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 4.6 feet below the unit.

Table 4 —Data Table

MODEL			40VMF036A--3	40VMF048A--3
Power Supply		V/Ph/Hz	208/230-1-60	
Total Cooling Capacity *1		Btu/h	36,000	48,000
Sensible Cooling Capacity *1		Btu/h	26,240	32,390
Heating Capacity *1		Btu/h	40,000	54,000
MCA		A	2.3	2.4
MOCP		A	15	
Panel / Grille			40VMF001----	
Filter			Installed in Panel / Grille	
Dimensions of Unit (H x W x D)		in.	11-3/4 x 33-1/8 x 33-1/8	
Dimensions of Panel / Grille (H x W x D)		in.	1-3/4 x 37-3/8 x 37-3/8	
Net Unit Weight		lbs	69.0	
Net Panel / Grille Weight		lbs	13.2	
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	1100/950/800	1200/1100/950
	Sound Pressure Level (H/M/L)*2	dBA	53.9/50.4/47.3	55.4/54.0/50.5
	Motor Input	W	182.7	202.3
Min. External Static Pressure (Factory Setting)		in. WG	0	
Max. External Static Pressure		in. WG	0.12	
Piping connections	Gas (Low) Pressure	in.	5/8	
	Liquid (High) Pressure	in.	3/8	
	Condensate	in.	1-1/4	
Condensate Lift		in.	29-1/2	
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:

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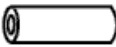
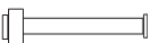
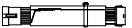
Cooling: Indoor 80°F (27°C) db / 67°F (20°C) wb; Outdoor 95°F (35°C) db

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 4.6 feet below the unit.

Accessories

Table 5 —Table of Accessories

NAME	SHAPE	QUANTITY	FUNCTION
Nut		8	To connect the construction cover board to the fan motor
Washer		8	To connect the construction cover board to the fan motor
Construction cover board		1	Used to cover the fan motor
Bolt		4	To connect the construction cover board to the fan motor
Insulation		2	For covering the coil stub outs
Insulation		1	For covering the condensate drain
Clamp		1	For connecting the drain
Tie rope		5	For insulation
Condensate connection		1	For connecting drain
PQ connection wire		2	To connect outdoor unit, indoor unit, and sub MDC
Copper Nut		1	Connect piping
Flexible conduit and connectors		1	Routing power lines
Field wiring conduit assembly instruction		1	Guide for installing the conduit assembly
Connection Wire		1	For connecting occupancy sensor
Copper pipe for gas side		1	For connecting refrigerant pipe
Copper pipe for liquid side		1	For connecting refrigerant pipe
No Beep Harness		1	Prevent beeping noise

LEGEND:

MDC – Multiport Distribution Controller

PIPING DIAGRAM

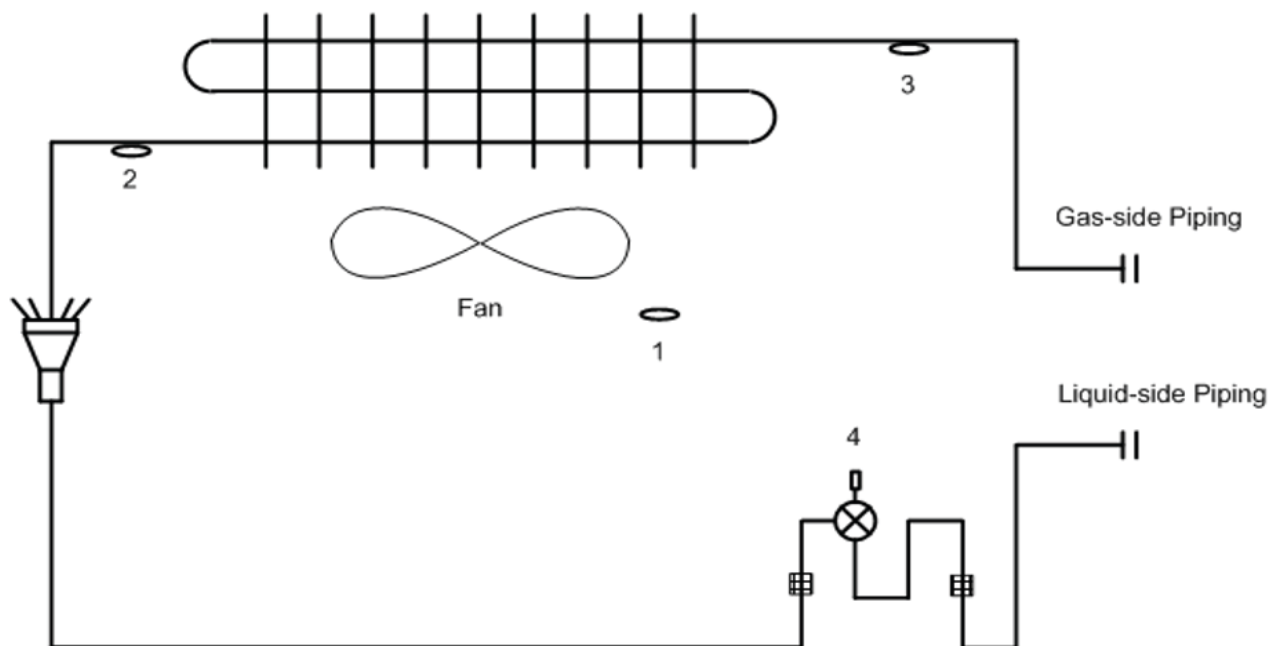


Fig. 1 —Piping

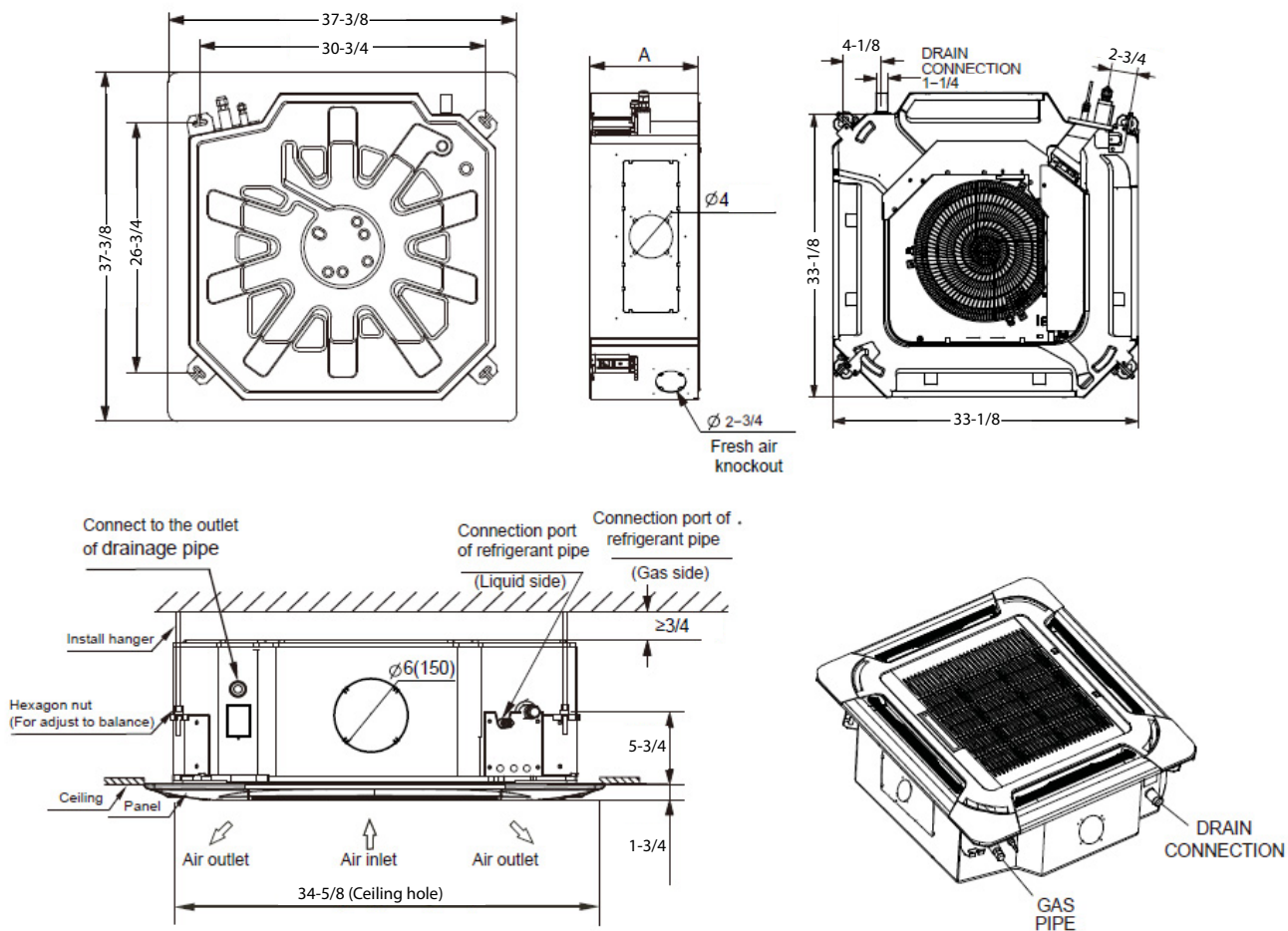
Table 6 —Piping

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
40VMF009A/012A/015A--3	1/2	1/4
40VMF018A/024A/030A/036A/-48A--3	5/8	3/8

DIMENSIONS



NOTE: All dimensions are shown in inches.

40VMF UNIT SIZE	DIMENSION A
009A	9
012A	
015A	
018A	11-3/4
024A	
030A	
036A	
048A	

Fig. 2 —40VMF009A--3 to 40VMF048A--3

WIRING DIAGRAM

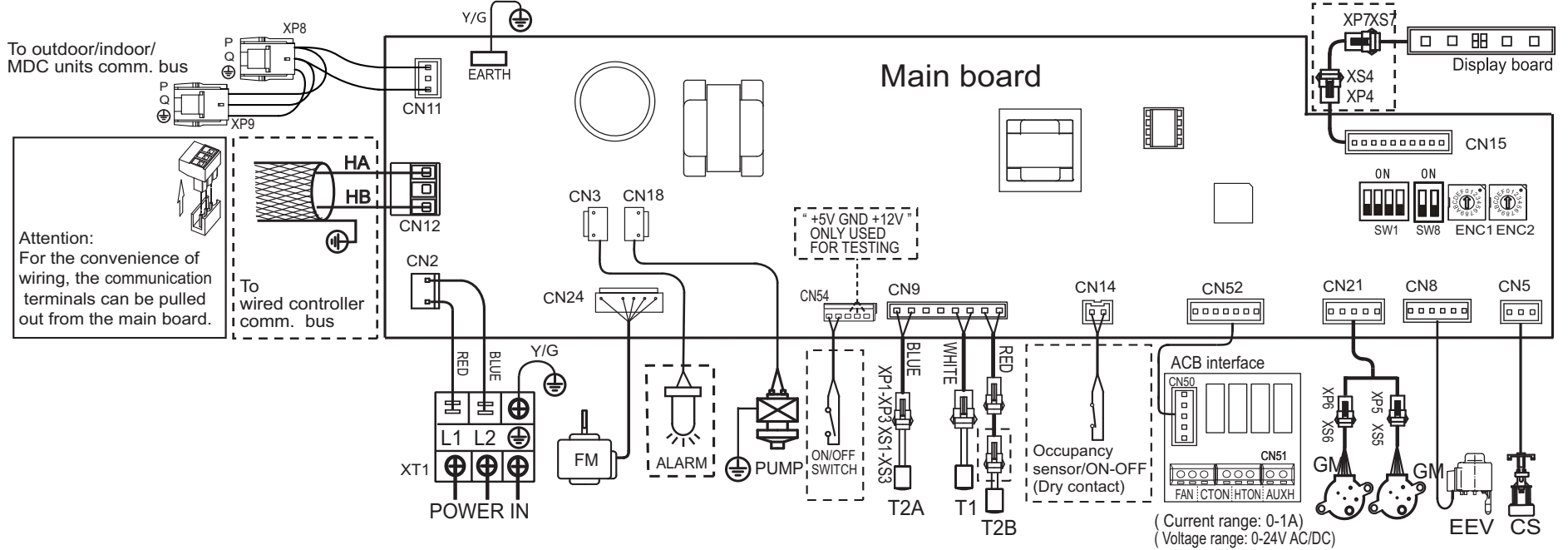


Fig. 3 —40VMF009A--3 to 40VMF048A--3

LEGEND:

ACB	—	Auxiliary Control Board AUXH	FM	—	Indoor Fan Motor	T1	—	Inlet Air Temperature
AUXH	—	Output For Auxiliary Heat	GM	—	Louver Motor	T2A	—	Coil Temperature
CS	—	Condensate Switch	HTON	—	Output for Heating Operation	T2B	—	Evap. Outlet Temperature in Cooling Mode
CTON	—	Output for Cooling Operation	MDC	—	Multiport Distribution Controller	XP1-9	—	Plug
EEV	—	Electronic Expansion Valve	PUMP	—	Pump Motor	XS1-9	—	Jack
FAN	—	DC Indoor Fan				XP-7/XS7	—	Connector

Wiring Diagram Definitions and Settings (40VMF009A--3 to 40VMF048A--3)

Table 9 —Code / Title

CODE	TITLE
FM	Indoor Fan Motor
T1	Room Temperature Sensor
T2A	Inlet Pipe Temperature Sensor
T2B	Outlet Pipe Temperature Sensor
ALARM	Warning Lamp
EEV	Electronic Extension Valve
XP1-8	Connectors
XS1-6	
XT1	Terminal
PUMP	Pump Motor
CS	Condensate Switch
GM	Swing Motor

Table 10 —SW1 Definition

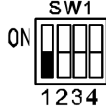
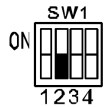
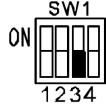
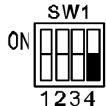
	0 means auto addressing mode (Default)
	1 means factory test mode
	0 means normal mode (Default)
	1 means factory self-checking mode (Reserved)
	Reserved
	0 means standard indoor unit (Default)
	1 means main indoor unit (must be addressed #63)

Table 11 —ENC1 / ENC2

 ENC1	Reserved	 ENC2	Reserved
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Table 12 —J1 Definition

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

Table 13 —SW8 Definition

	Reserved
	Reserved

Table 14 —0/1 Definition

	Means 0
	Means 1

Table 15 —Error Code / Content

dd	Heating / Cooling Conflict
E1	Communication Error with Outdoor Unit
E2	Temperature Sensor (T1) 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 the First Time

ELECTRICAL CHARACTERISTICS

Table 16 —Electrical Characteristics

MODEL	POWER SUPPLY					IFM	
	Hz	VOLTS	VOLTAGE RANGE	MCA	MOCP	W	FLA
40VMF009A--3	60	208/230V	Max.253V Min.187V	0.73	15	80	0.59
40VMF012A--3				0.91	15	80	0.72
40VMF015A--3				1.1	15	170	0.81
40VMF018A--3				2.0	15	170	1.60
40VMF024A--3				1.3	15	170	0.98
40VMF030A--3				1.7	15	170	1.40
40VMF036A--3				2.3	15	170	1.80
40VMF048A--3				2.4	15	170	2.00

MCA: Minimum Circuit Amps (A)

MOCP: Maximum Over Current Protection (A)

SYMBOLS: W: Fan Motor Rated Output (W)

FLA: Full Load Amps (A)

IFM: Indoor Fan Motor

AIR THROW CHARTS

40VMF009A--3

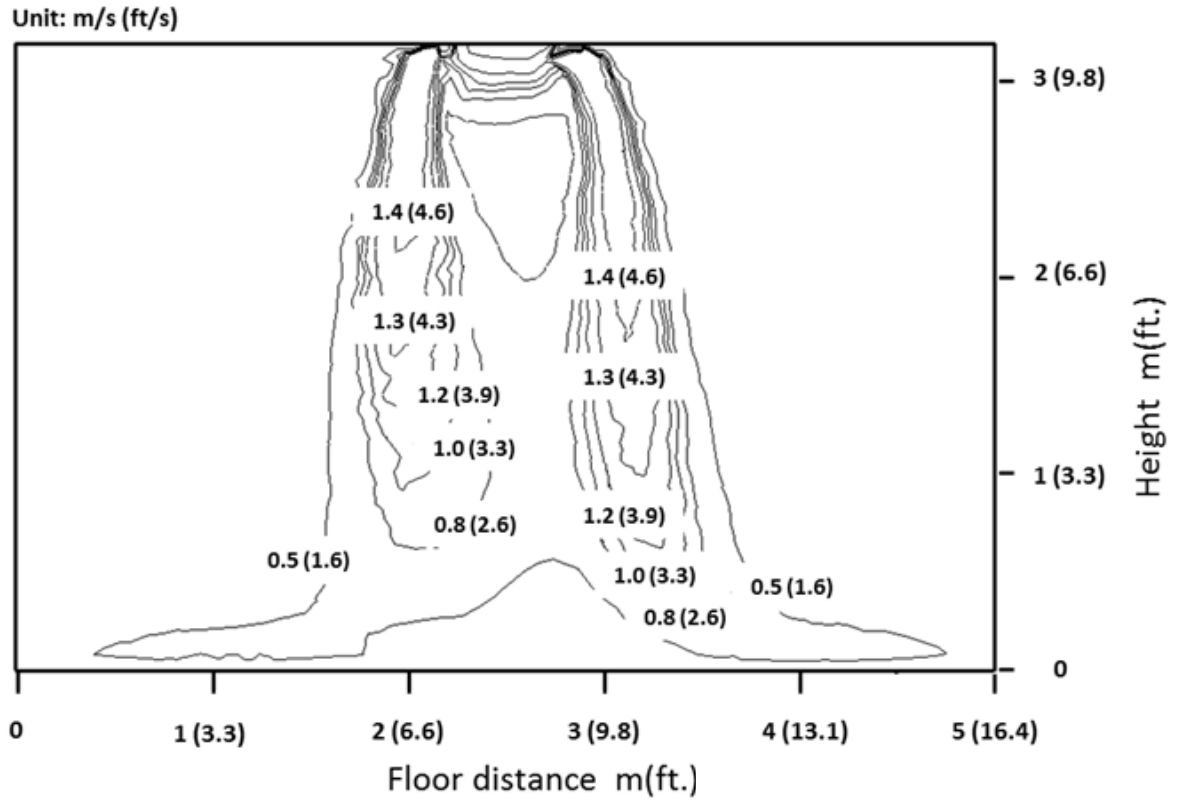


Fig. 4 —Cooling Velocity

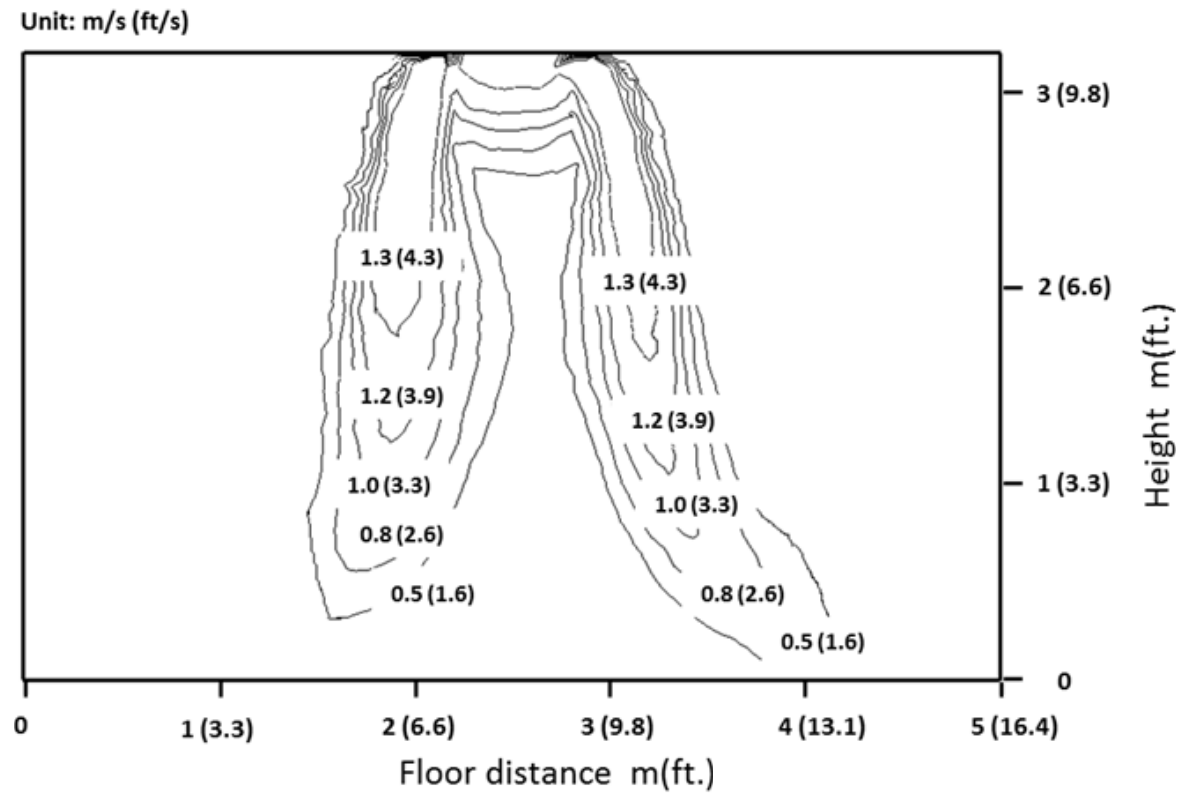


Fig. 5 —Heating Velocity

Unit: m/s (ft/s)

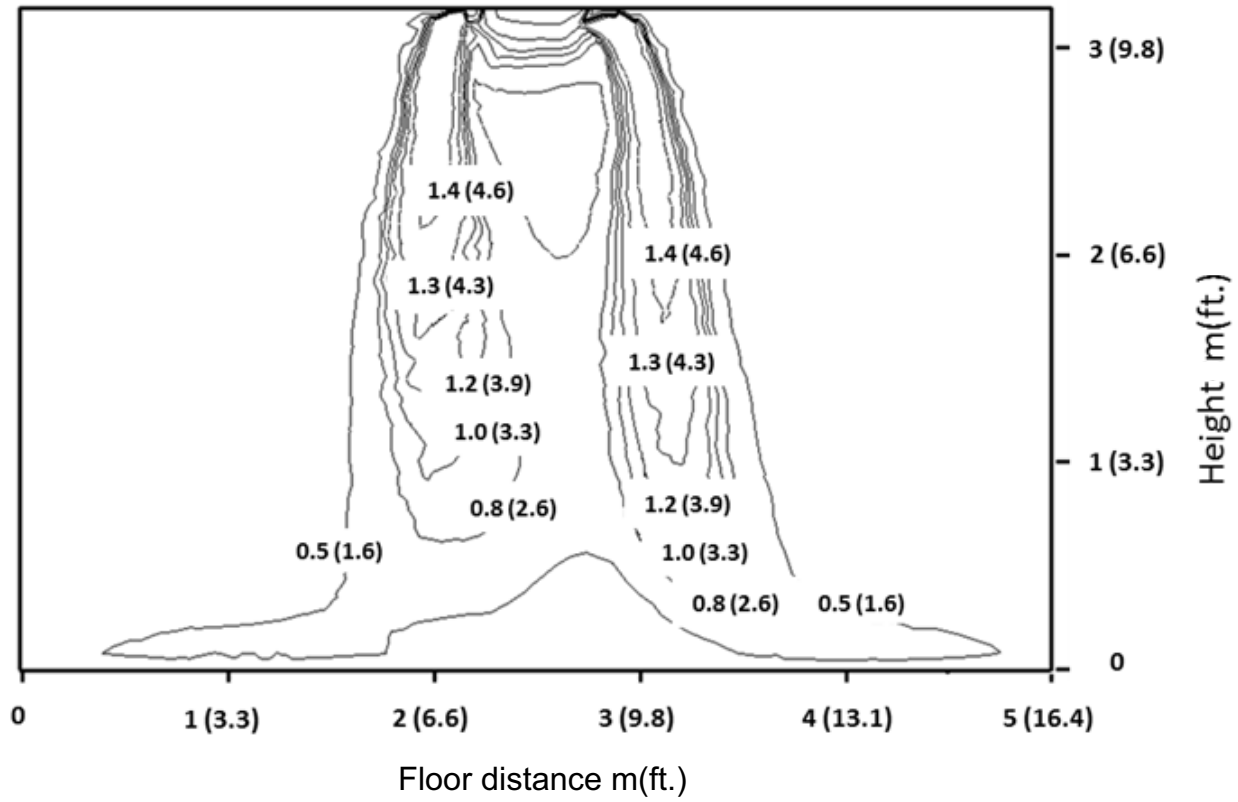


Fig. 6 —Cooling mode with 60°swing

Unit: m/s (ft/s)

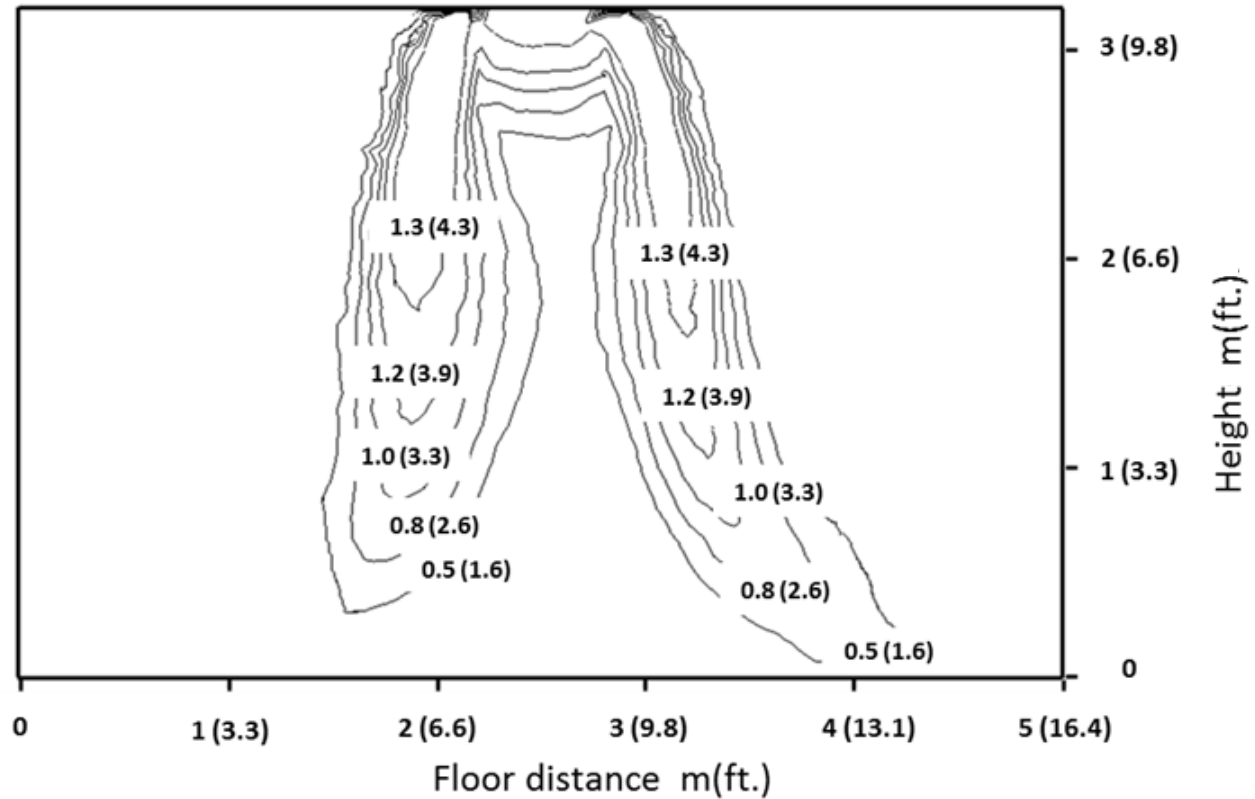


Fig. 7 —Heating mode with 60°swing

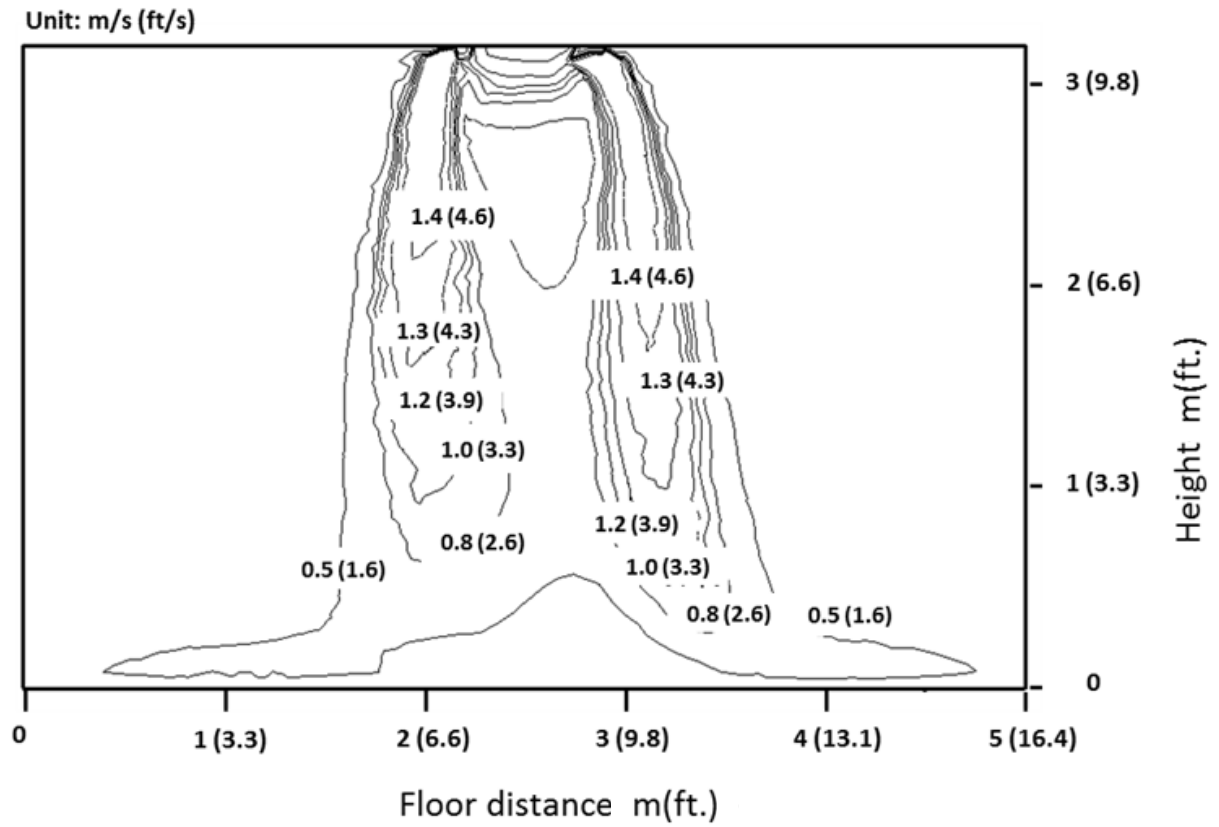


Fig. 8 —Cooling mode with 60°swing

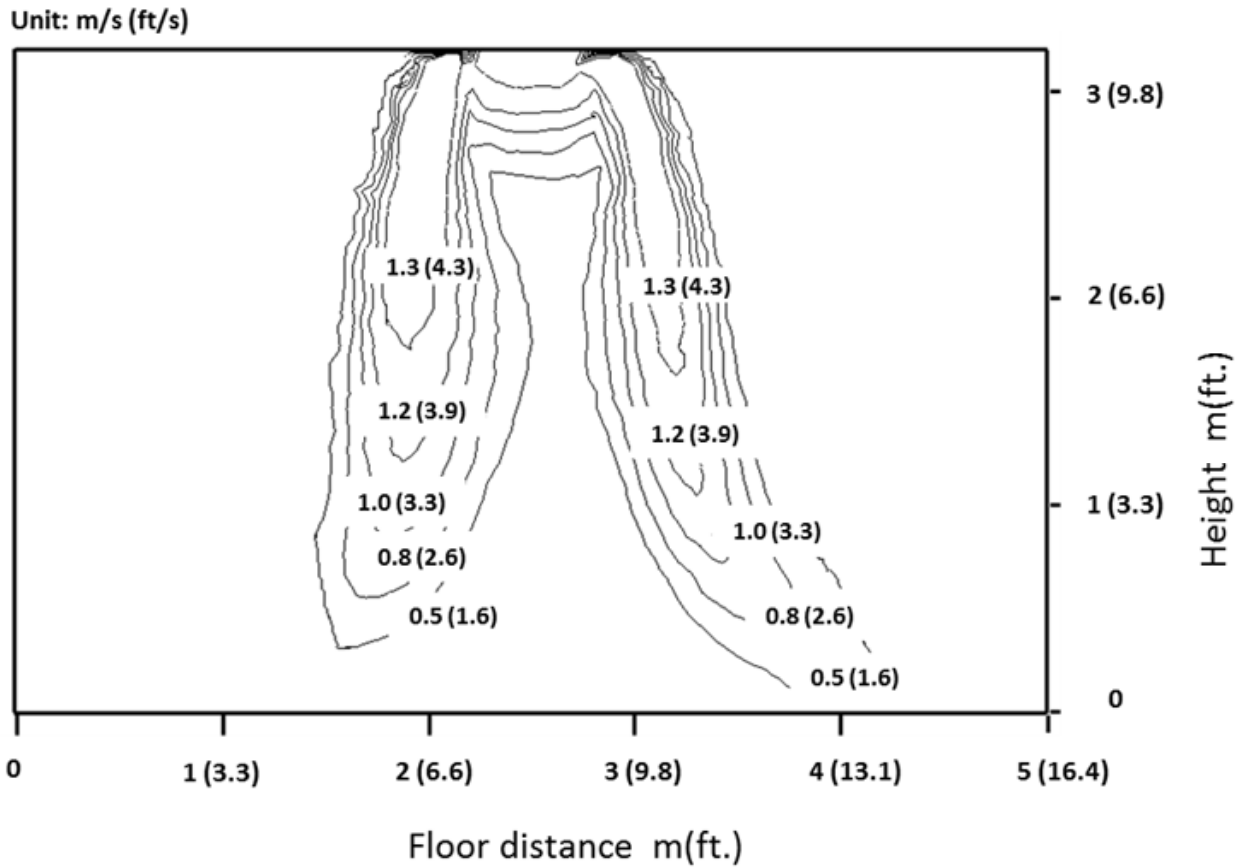


Fig. 9 —Heating mode with 60°swing

Unit: m/s (ft/s)

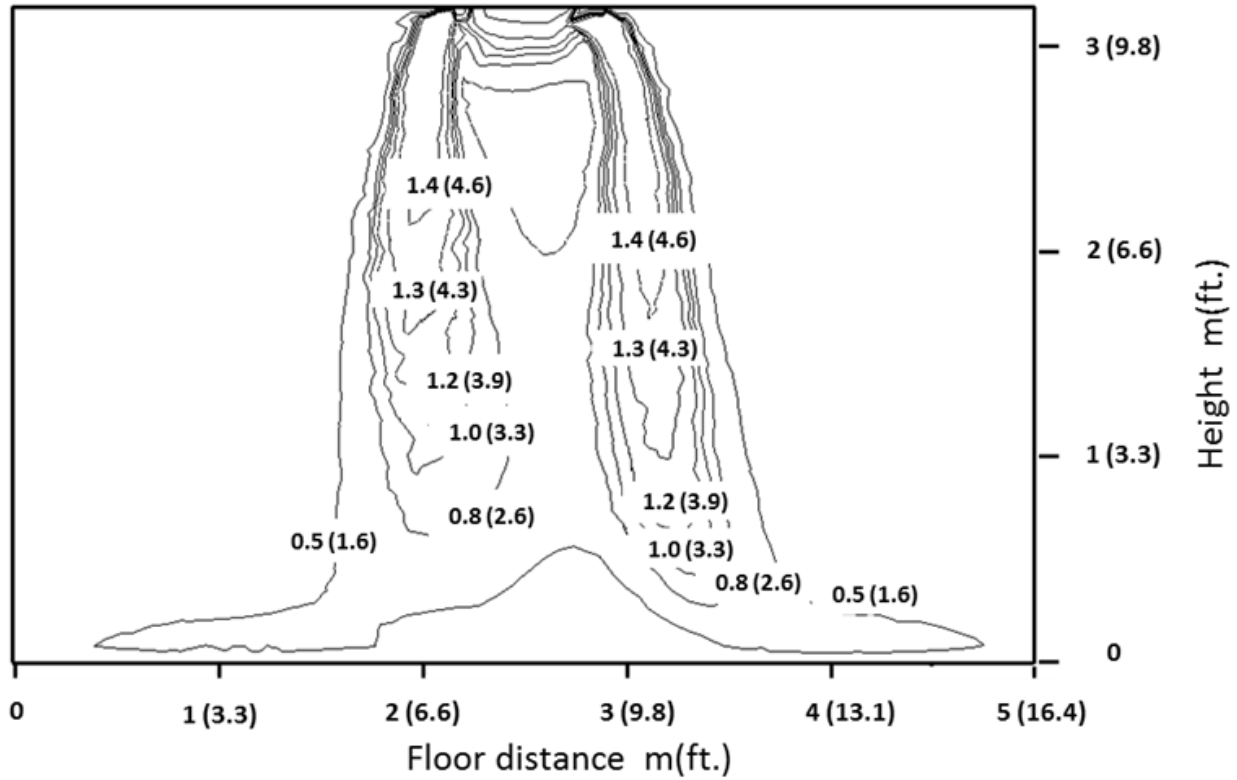


Fig. 10 —Cooling mode with 60°swing

Unit: m/s (ft/s)

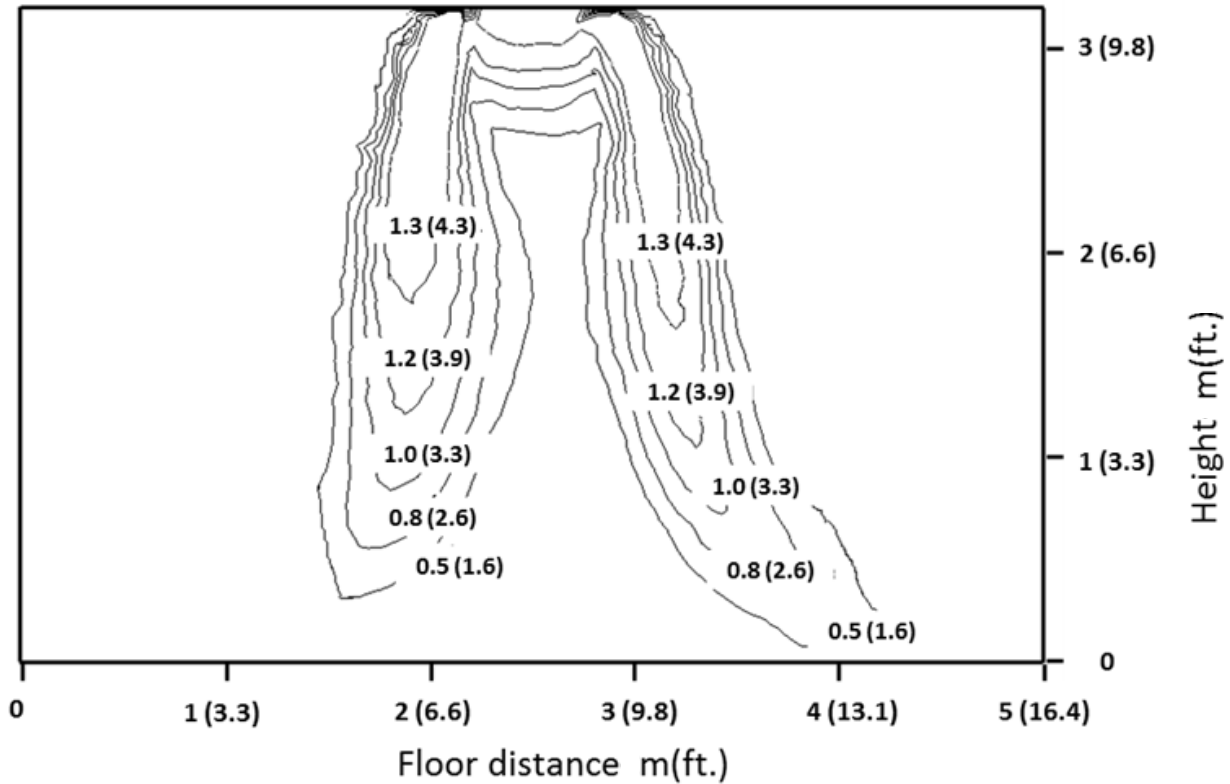


Fig. 11 —Heating mode with 60°swing

Unit: m/s (ft/s)

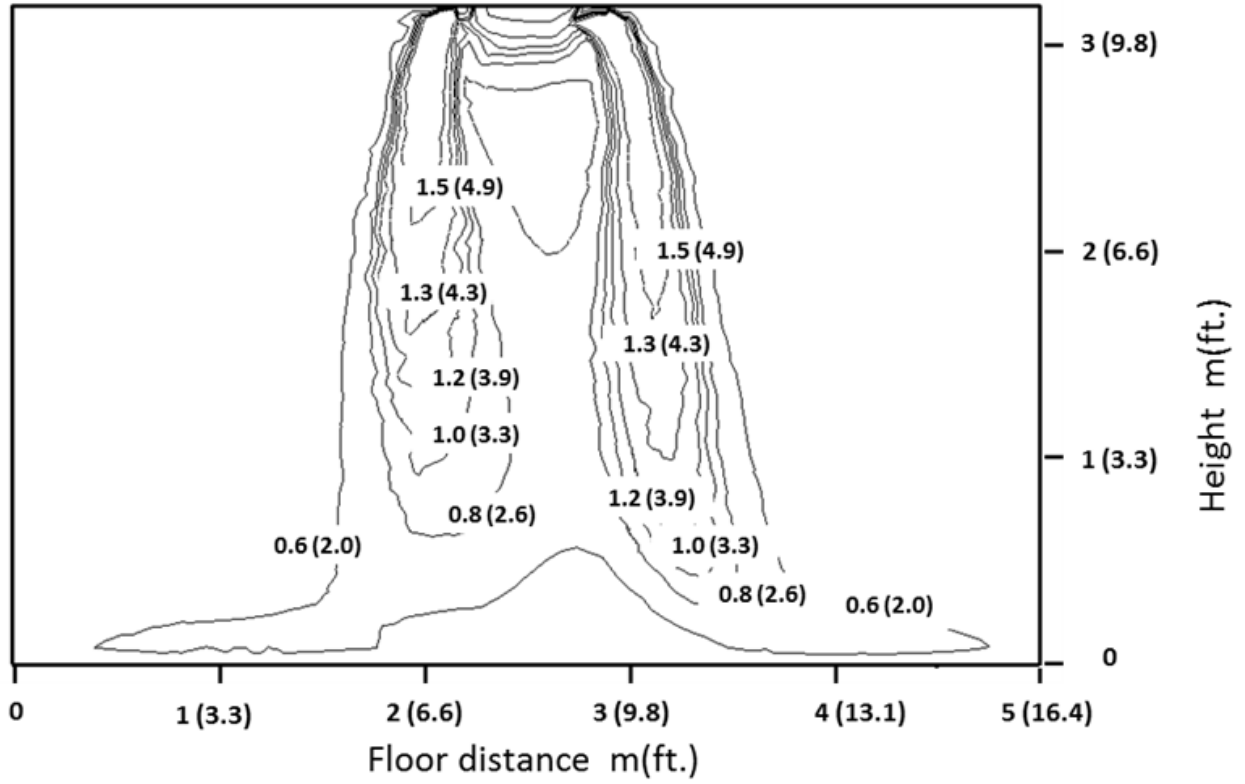


Fig. 12 —Cooling mode with 60°swing

Unit: m/s (ft/s)

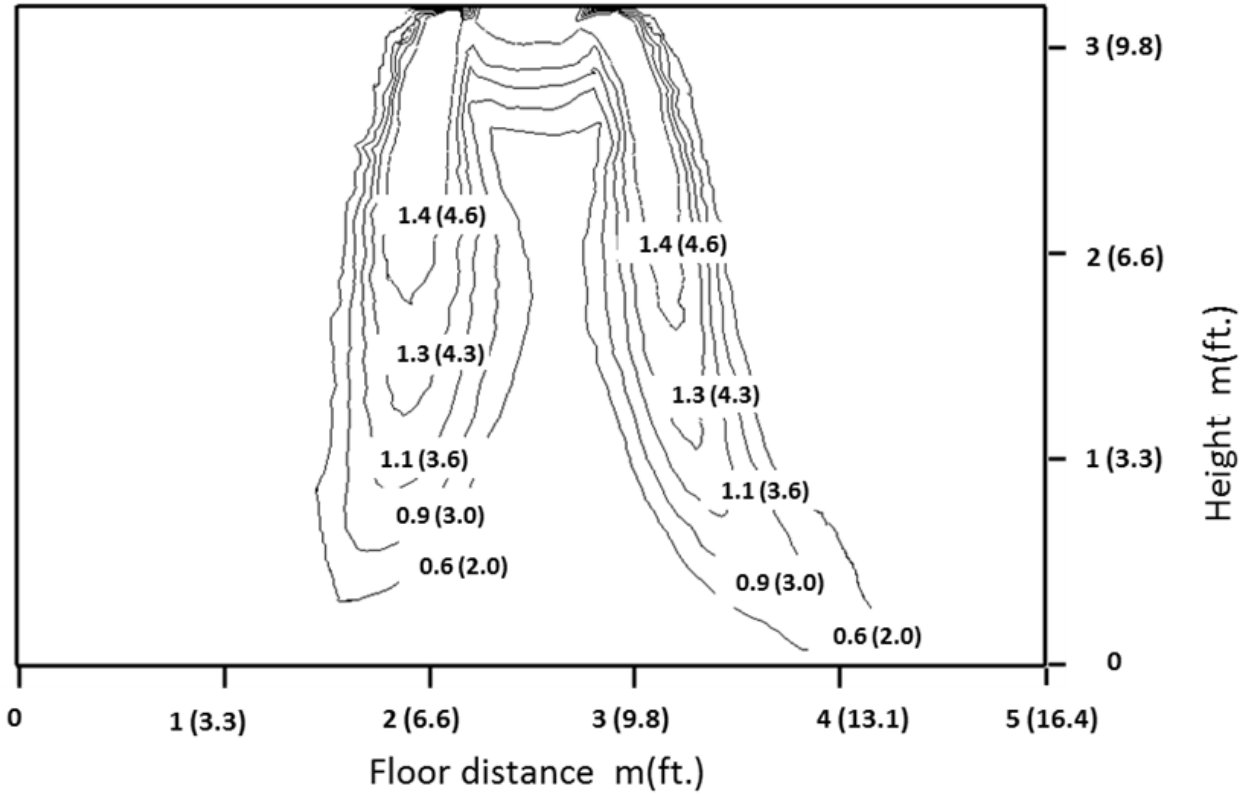


Fig. 13 —Heating mode with 60°swing

Unit: m/s (ft/s)

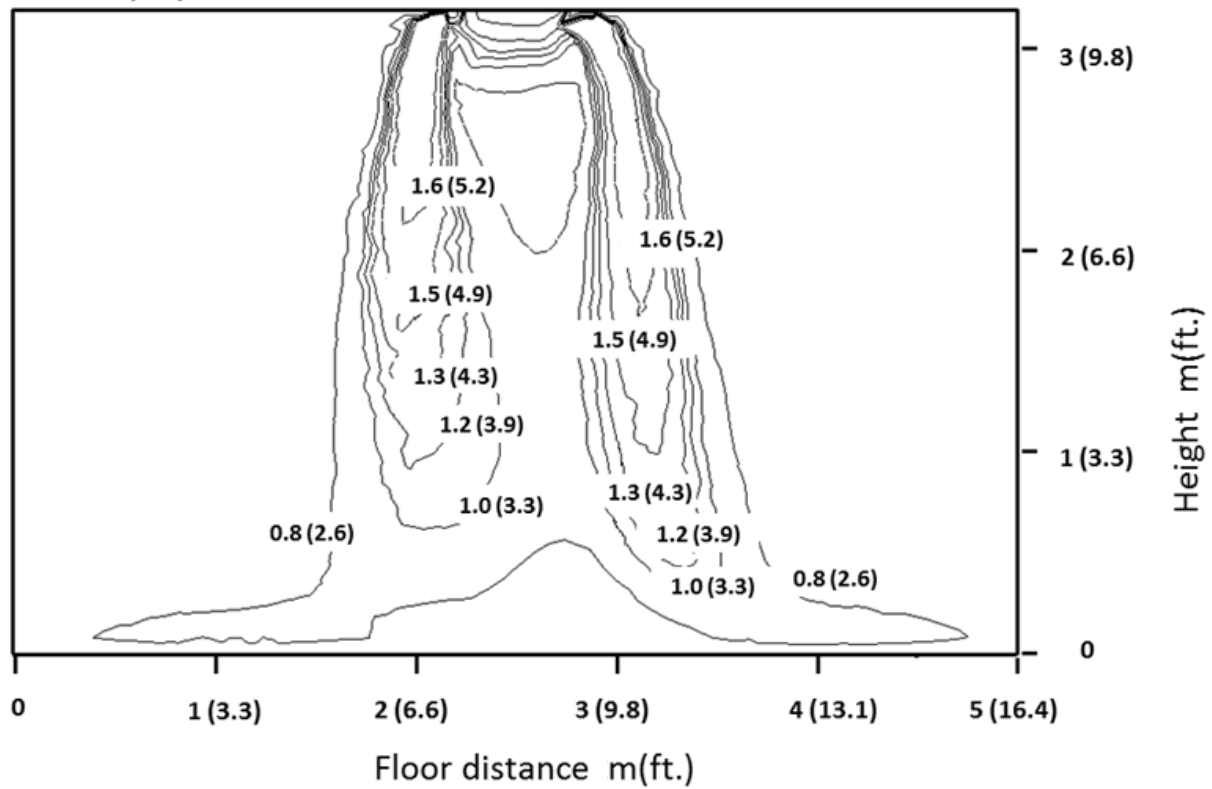


Fig. 14 —Cooling mode with 60°swing

Unit: m/s (ft/s)

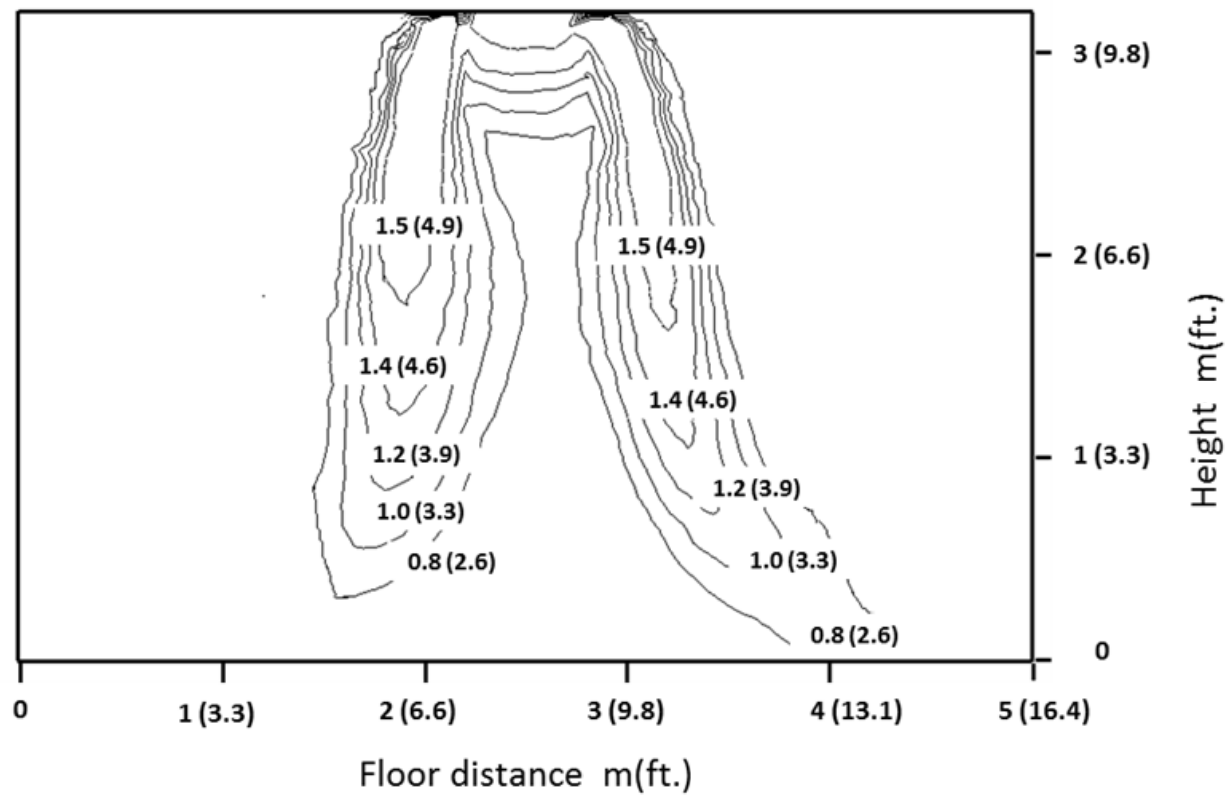


Fig. 15 —Heating mode with 60°swing

Unit: m/s (ft/s)

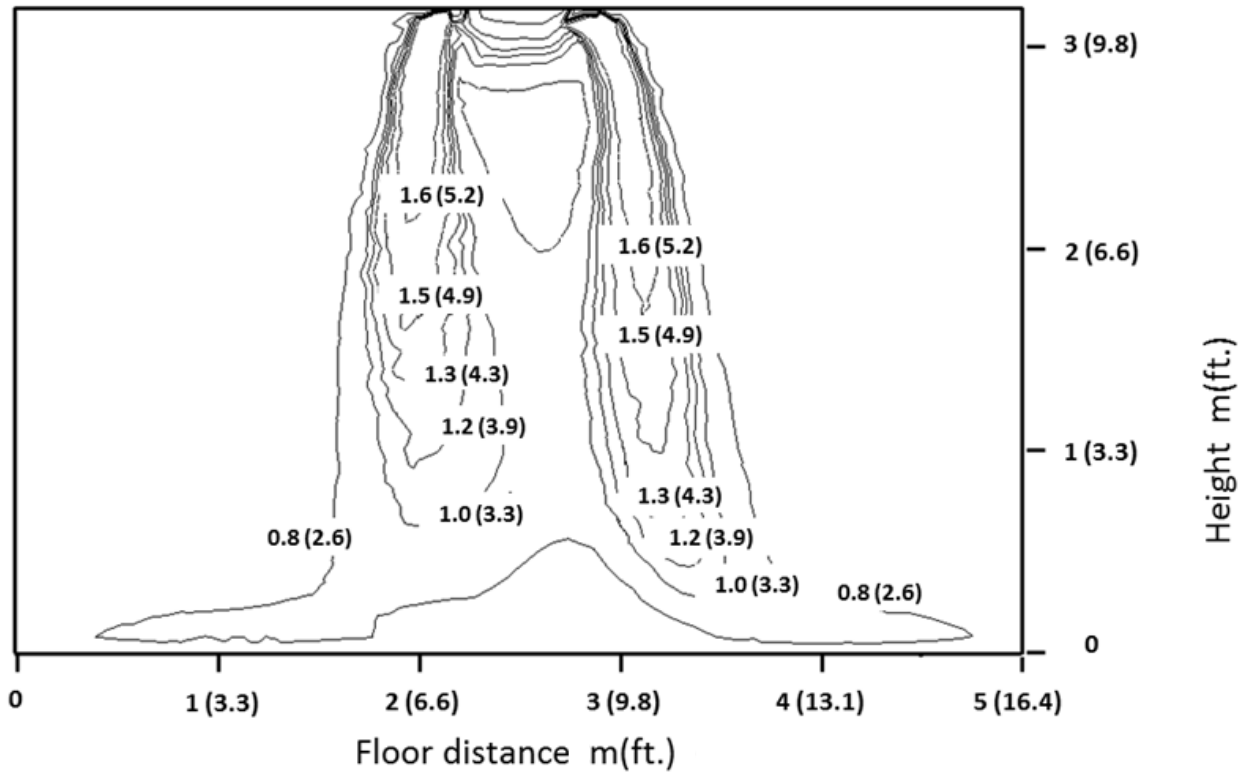


Fig. 16 —Cooling mode with 60°swing

Unit: m/s (ft/s)

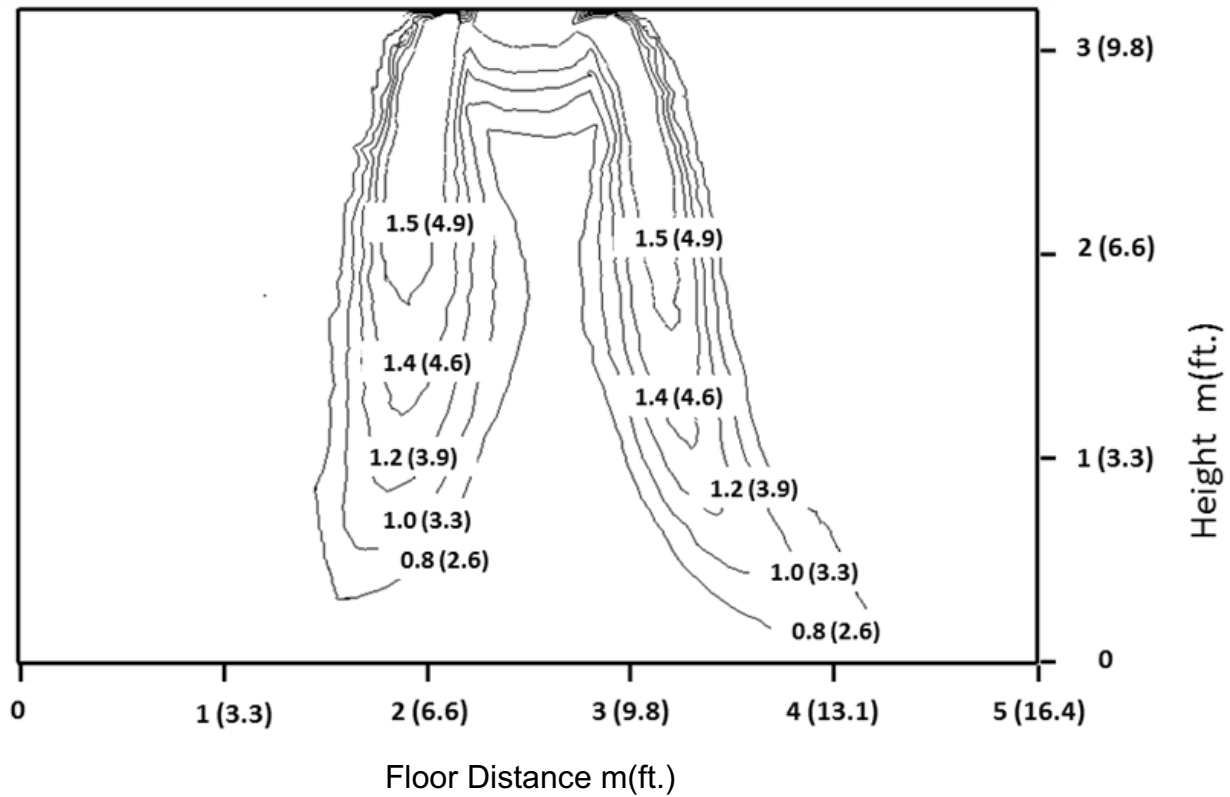


Fig. 17 —Heating mode with 60°swing

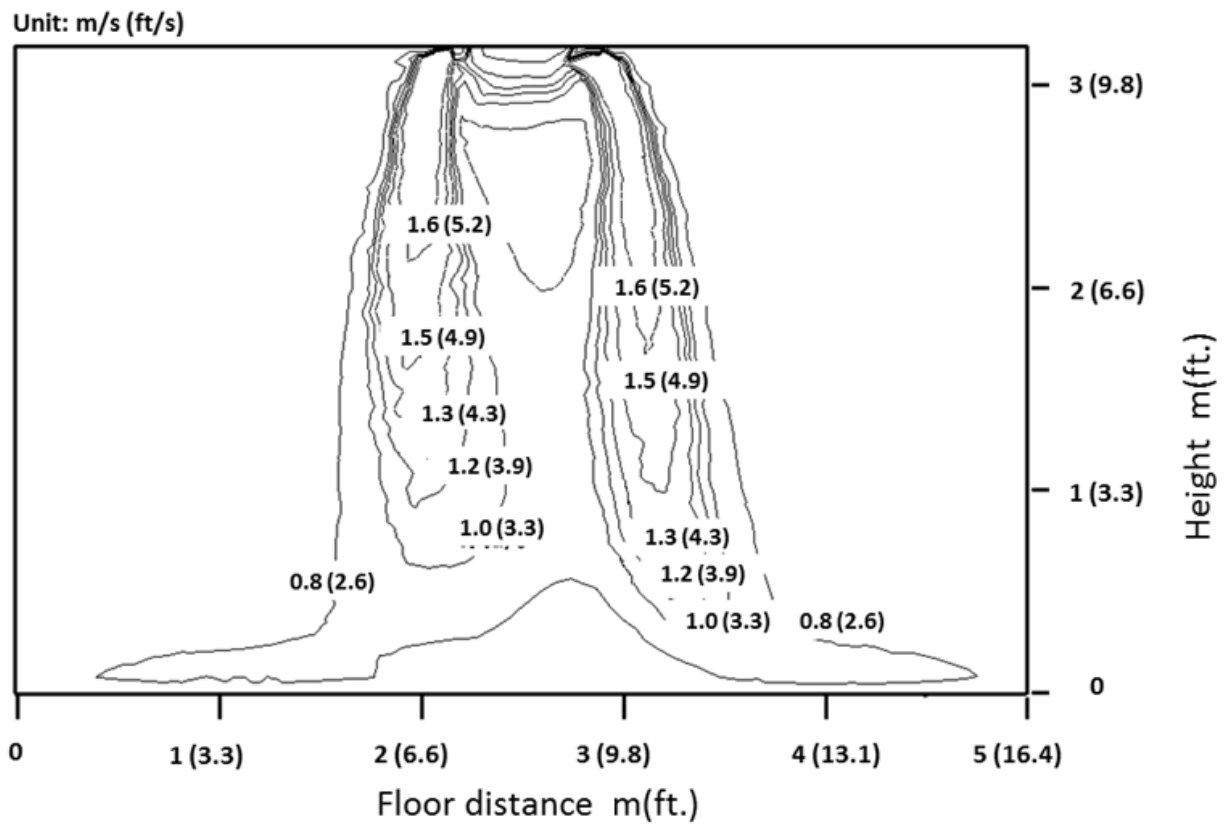


Fig. 18 —Cooling mode with 60°swing

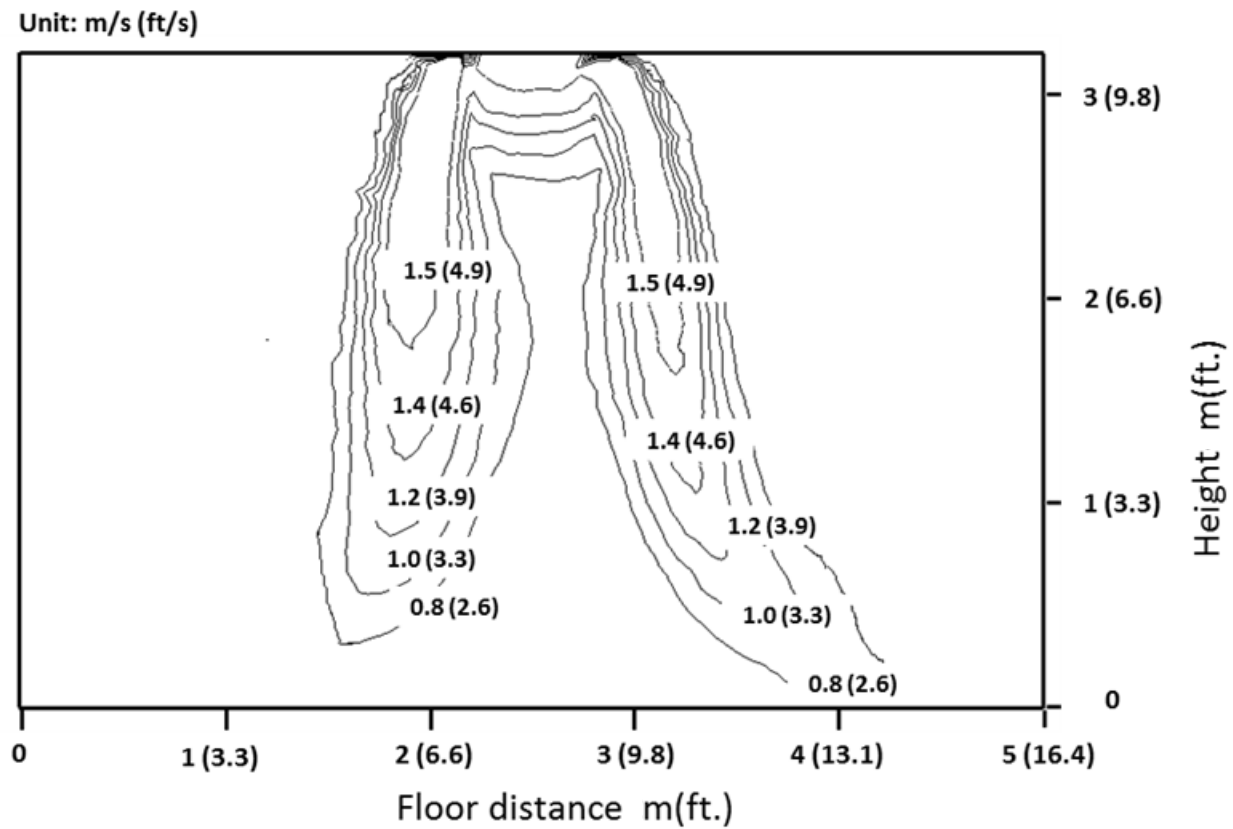


Fig. 19 —Heating mode with 60°swing

SOUND DATA

Sound Pressure Levels

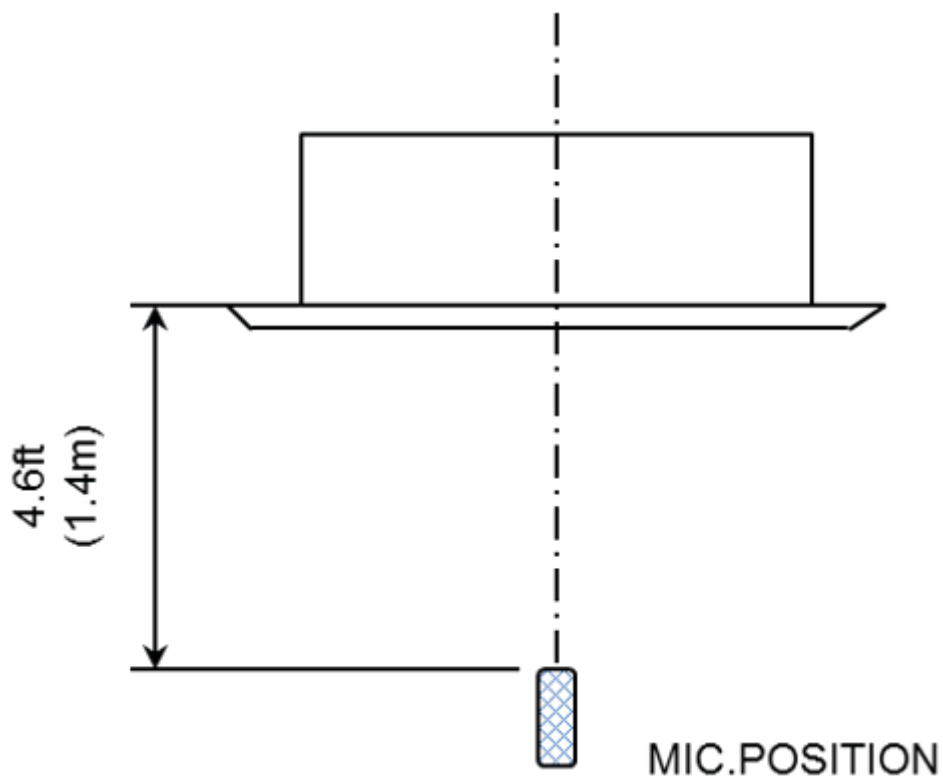


Fig. 20 —Overall Sound Levels

Table 17 —Cooling Mode

MODEL	H	M	L
40VMF009A--3	36.7	34.0	32.1
40VMF012A--3	41.3	37.3	33.0
40VMF015A--3	45.2	41.5	36.9
40VMF018A--3	52.5	43.1	40.2
40VMF024A--3	44.6	42.5	40.2
40VMF030A--3	48.8	45.1	42.1
40VMF036A--3	53.4	50.0	47.3
40VMF048A--3	55.1	52.8	50.2

NOTE: Units are in dBA

Table 18 —Heating Mode

MODEL	H	M	L
40VMF009A--3	36.3	32.6	29.3
40VMF012A--3	41.4	36.5	32.6
40VMF015A--3	45.6	40.7	37.0
40VMF018A--3	52.8	42.7	39.4
40VMF024A--3	44.7	41.4	38.5
40VMF030A--3	48.9	44.7	41.4
40VMF036A--3	53.9	50.4	46.8
40VMF048A--3	55.1	54.0	50.5

NOTE: Units are in dBA

NC Curves

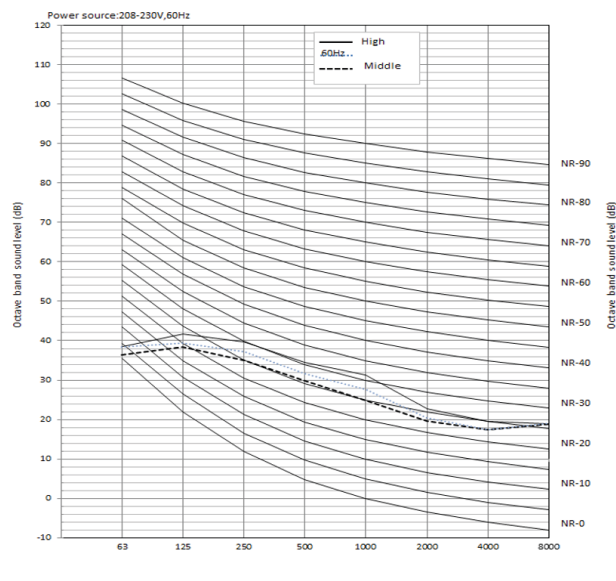


Fig. 21 —40VMF009A--3

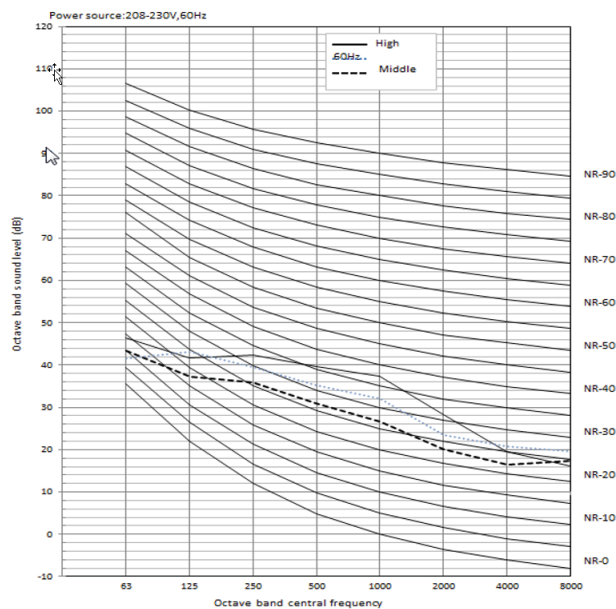


Fig. 22 —40VMF012A--3

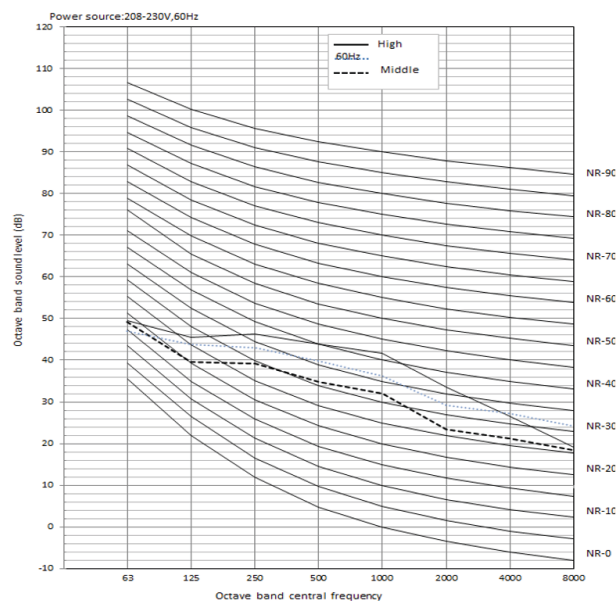


Fig. 23 —40VMF015A--3

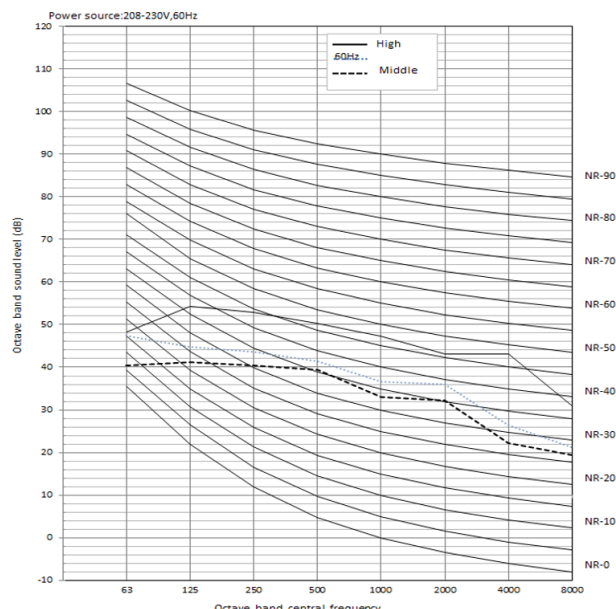


Fig. 24 —40VMF018A--3

NC Curves (Cont.)

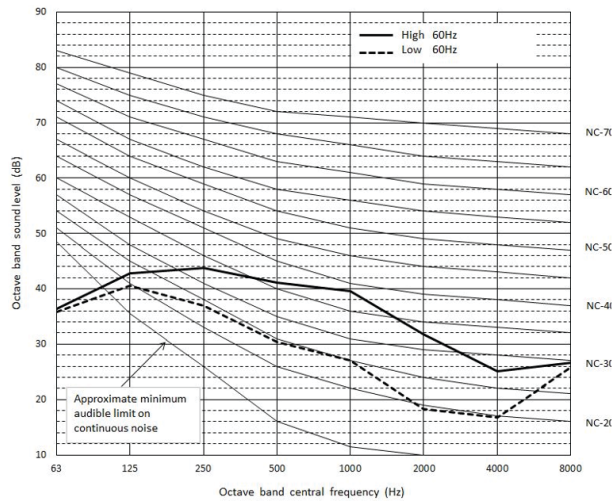


Fig. 25 —40VMF024A--3

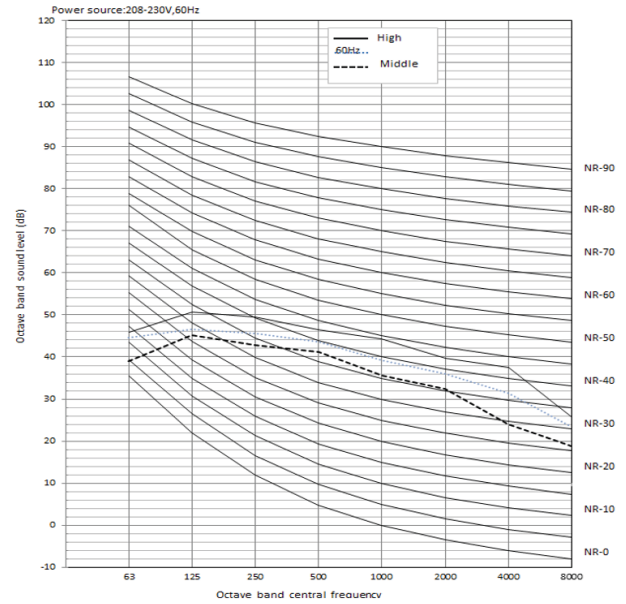


Fig. 26 —40VMF030A--3

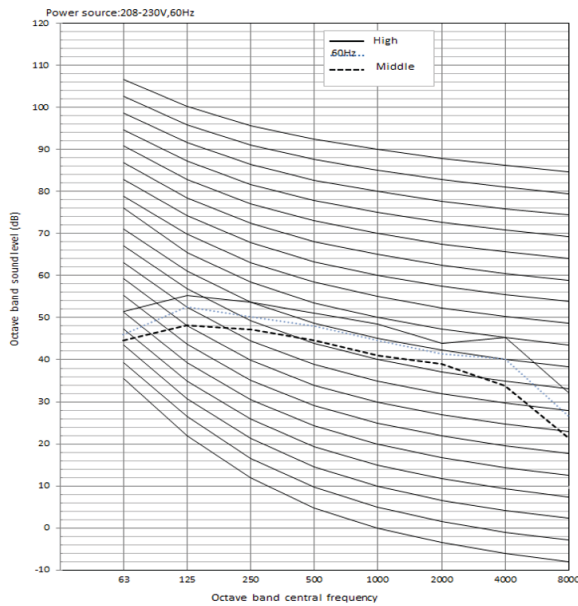


Fig. 27 —40VMF036A--3

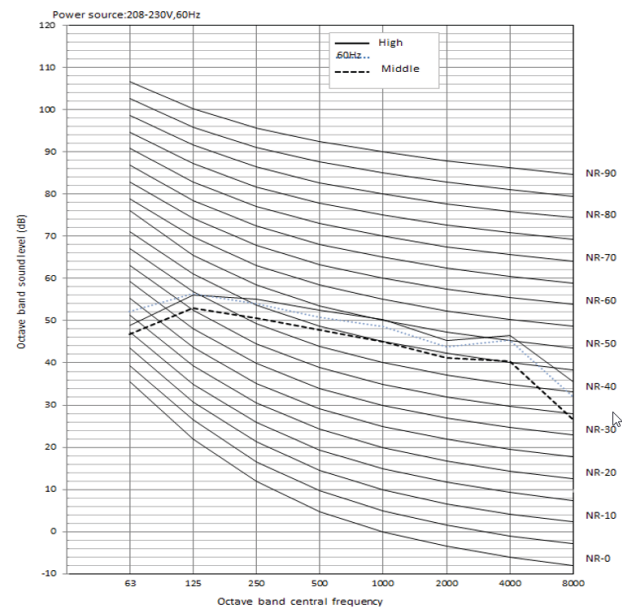


Fig. 28 —40VMF048A--3

CAPACITY DATA TABLES

Table 19 —Cooling Capacity

INDOOR UNIT ENTERING AIR CONDITIONS:		COOLING CAPACITY INDICATION															
		9K		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	TC	SC
70	58	5.65	5.45	7.54	7.16	9.42	8.79	11.31	10.35	15.07	12.78	18.84	15.12	22.61	18.16	30.15	22.43
70	62	7.14	5.25	9.52	6.33	11.9	7.83	14.28	9.27	19.04	11.85	23.8	14.42	28.56	17.27	38.08	22.33
70	67	9	3.86	12	5.14	15	6.44	18	7.71	24	10.4	30	13.18	36	15.72	48	21.65
70	72	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
70	76	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
75	58	5.69	5.65	7.59	7.54	9.49	9.42	11.39	11.31	15.18	15.07	18.97	18.14	22.77	21.83	30.36	26.29
75	62	7.19	7.03	9.59	8.11	11.98	9.98	14.38	11.77	19.17	14.64	23.97	17.43	28.76	20.93	38.35	26.18
75	67	9.06	5.65	12.08	6.93	15.11	8.59	18.13	10.20	24.17	13.17	30.21	16.18	36.25	19.37	48.34	25.49
75	72	9.74	3.71	12.99	4.98	16.24	6.23	19.49	7.47	25.98	10.09	32.48	12.82	38.98	15.29	51.97	21.13
75	76	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
80	58	5.73	5.65	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	7.24	7.14	9.65	9.52	12.07	11.90	14.48	14.26	19.31	17.43	24.13	20.44	28.96	24.60	38.61	30.03
80	67	9.13	7.44	12.17	8.71	15.21	10.74	18.25	12.69	24.34	15.96	30.42	19.19	36.51	23.04	48.67	29.34
80	72	9.81	5.50	13.08	6.76	16.35	8.38	19.63	9.96	26.16	12.87	32.71	15.83	39.25	18.95	52.33	24.97
80	76	10.34	3.92	13.79	5.16	17.23	6.44	20.68	7.71	27.57	10.33	34.46	13.03	41.36	15.55	55.14	21.29
85	58	5.77	5.65	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	7.29	7.14	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	9.19	8.42	12.25	10.50	15.32	12.90	18.38	15.19	24.51	18.75	30.63	22.21	36.76	26.71	49.02	33.20
85	72	9.88	7.29	13.17	8.55	16.47	10.53	19.76	12.45	26.34	15.66	32.94	18.84	39.53	22.61	52.70	28.82
85	76	10.41	5.71	13.89	6.94	17.35	8.60	20.82	10.20	27.76	13.11	34.70	16.04	41.65	19.21	55.53	25.14
90	58	5.81	5.65	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	7.34	7.14	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	9.25	9.00	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	9.95	9.08	13.26	10.34	16.58	12.69	19.90	14.95	26.53	18.46	33.17	21.86	39.80	26.29	53.07	32.68
90	76	10.49	7.50	13.98	8.73	17.47	10.75	20.97	12.70	27.96	15.90	34.94	19.05	41.94	22.88	55.91	28.99

TC : Total Cooling

SC : Sensible Cooling

Table 20 —Heating Capacity

MODEL	CAPACITY INDICATION	HEATING INDOOR AIR TEMP.							
		61°FDB	64°FDB	67°FDB	70°FDB	73°FDB	75°FDB	77°FDB	80°FDB
		TC	TC	TC	TC	TC	TC	TC	TC
Four way cassette	9	10.60	10.40	10.20	10.00	9.33	8.88	8.44	7.77
	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

TC : Total Cooling