

Engineering Data Book



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VERTICAL AIR HANDLING UNIT BASIC INFORMATION

Specifications

Table 1 —Data Table

MODEL NAME			40VMV012---3	40VMV018---3
Power Source		V-Ph-Hz	208/230-1-60	
Total Cooling Capacity*1		Btu/h	12,000	18,000
Sensible Cooling Capacity*1		Btu/h	8,710	12,940
Heating Capacity*1		Btu/h	13,500	21,000
Electrical Supply	MCA	A	1.50	3.80
	MOCP	A	15	
Fan	Type		Centrifugal	
	Air flow rate (H/M/L)	cfm	400/320/320	600/510/420
	Max. External static pressure (ESP)	in. WG	0.80	
Fan Motor	Type		DC	
	Output	W	100	370
Heat Exchanger			Inner Groove Copper Tube and Hydrophilic Aluminum fin	
Refrigerant Control			Electronic Expansion Valve	
Dimensions	H (in)		46-1/2	
	W (in)		19-5/8	
	D (in)		20-5/8	
Net Weight		lbs	119.0	123.0
Sound Pressure Level*2	H - dBA		37.6	41.6
	M - dBA		34.5	37.1
	L - dBA		34.5	34.4
Piping Connections	Gas (Low) Pressure	In	1/2	5/8
	Liquid (High) Pressure	In	1/4	3/8
	Condensate	In	3/4 NPT	
Connectable Outdoor Unit			38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump	
Casing			Galvanized Steel	
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. See page 15 for more details.

Table 2 —Data Table

MODEL NAME			40VMV024---3	40VMV030---3
Power Source		V-Ph-Hz	208/230-1-60	
Total Cooling Capacity*1		Btu/h	24,000	30,000
Sensible Cooling Capacity*1		Btu/h	17,270	21,460
Heating Capacity*1		Btu/h	27,000	34,000
Electrical Supply	MCA	A	3.80	
	MOCP	A	15	
Fan	Type		Centrifugal	
	Air flow rate (H/M/L)	cfm	800/680/560	1000/850/700
	Max. External static pressure (ESP)	in. WG	0.80	
Fan Motor	Type		DC	
	Output	W	370	
Heat Exchanger			Inner Groove Copper Tube and Hydrophilic Aluminum fin	
Refrigerant Control			Electronic Expansion Valve	
Dimensions		H (in)	46-1/2	
		W (in)	19-5/8	
		D (in)	20-5/8	
Net Weight		lbs	123.0	
Sound Pressure Level*2		H - dBA	46.2	52.2
		M – dBA	42.3	48.4
		L – dBA	37.9	44.4
Piping Connections	Gas (Low) Pressure	In	5/8	
	Liquid (High) Pressure	In	3/8	
	Condensate	In	3/4 NPT	
Connectable Outdoor Unit			38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump	
Casing			Galvanized Steel	
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. See page 15 for more details.

Table 3 —Data Table

MODEL NAME			40VMV036---3		40VMV048---3	
Power Source		V-Ph-Hz	208/230-1-60			
Total Cooling Capacity*1		Btu/h	36,000		48,000	
Sensible Cooling Capacity*1		Btu/h	26,340		34,500	
Heating Capacity*1		Btu/h	40,000		54,000	
Electrical Supply	MCA	A	5.30			
	MOCP	A	15			
Fan	Type		Centrifugal			
	Air flow rate (H/M/L)	cfm	1200/1020/840		1600/1360/1120	
	Max. External static pressure (ESP)	in. WG	0.80			
Fan Motor	Type		DC			
	Output		560			
Heat Exchanger			Inner Groove Copper Tube and Hydrophilic Aluminum fin			
Refrigerant Control			Electronic Expansion Valve			
Dimensions		H (in)	54-1/2			
		W (in)	22			
		D (in)	24			
Net Weight		lbs	163.0			
Sound Pressure Level*2		H - dBA	46.9		53.0	
		M – dBA	44.1		48.5	
		L – dBA	39.3		43.8	
Piping Connections	Gas (Low) Pressure	In	5/8			
	Liquid (High) Pressure	In	3/8			
	Condensate	In	3/4 NPT			
Connectable Outdoor Unit			38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump			
Casing			Galvanized Steel			
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. See page 15 for more details.

Table 4 —Data Table

MODEL NAME			40VMV054---3
Power Source		V-Ph-Hz	208/230-1-60
Total Cooling Capacity*1		Btu/h	53,500
Sensible Cooling Capacity*1		Btu/h	38,370
Heating Capacity*1		Btu/h	60,000
Electrical Supply	MCA	A	7.20
	MOCP	A	15
Fan	Type		Centrifugal
	Air flow rate (H/M/L)	cfm	1800/1530/1260
	Max. External static pressure (ESP)	in. WG	0.80
Fan Motor	Type		DC
	Output	W	560
Heat Exchanger			Inner Groove Copper Tube and Hydrophilic Aluminum fin
Refrigerant Control			Electronic Expansion Valve
Dimensions		H (in)	54-1/2
		W (in)	22
		D (in)	24
Net Weight		lbs	163.0
Sound Pressure Level*2		H - dBA	57.1
		M – dBA	52.6
		L – dBA	47.9
Piping Connections	Gas (Low) Pressure	In	5/8
	Liquid (High) Pressure	In	3/8
	Condensate	In	3/4 NPT
Connectable Outdoor Unit			38VMH – Heat Pump 38VMR – Heat Recovery 38VMH-1P – Single Phase Heat Pump
Casing			Galvanized Steel
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:

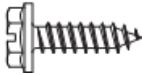
Cooling: Indoor 80°F (27°C) db/67°F (20°C) wb; Outdoor 95°F (35°C) db

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. See page 15 for more details.

Accessories

Table 5 —Table of Accessories

NAME of ACCESSORIES	QUANTITY	OUTLINE	USAGE
Copper pipe	2		Reducer for smaller pipe diameter (sizes 012 and 018 only)
Drain plug	2		Plug for drain pan outlet
Wire grommet	2		For wire routing
Tie rope	3		-----
Screw	4		-----
PQE connection wire	2		To connect the outdoor unit, indoor unit, and sub MDC
Connection wire	1		For occupancy sensor

MDC: Multiport Distribution Controller

PIPING DIAGRAM

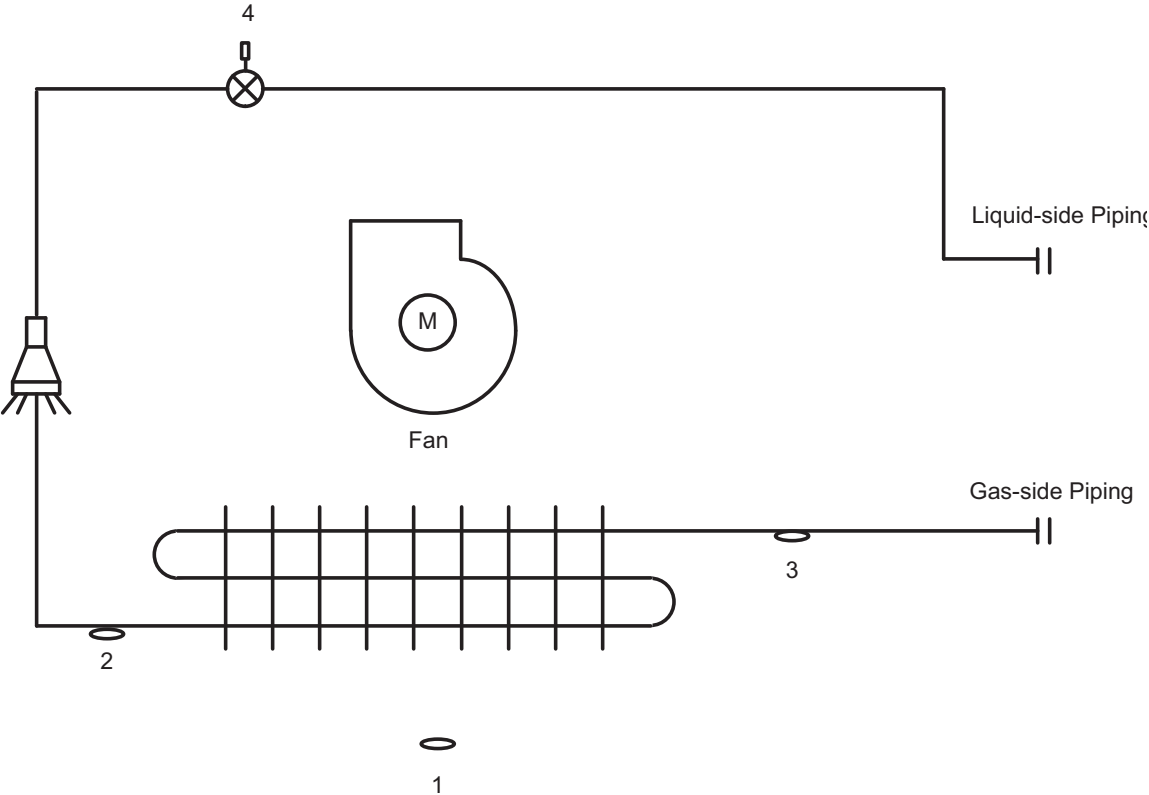


Fig. 1 —Piping

Table 6 —Piping

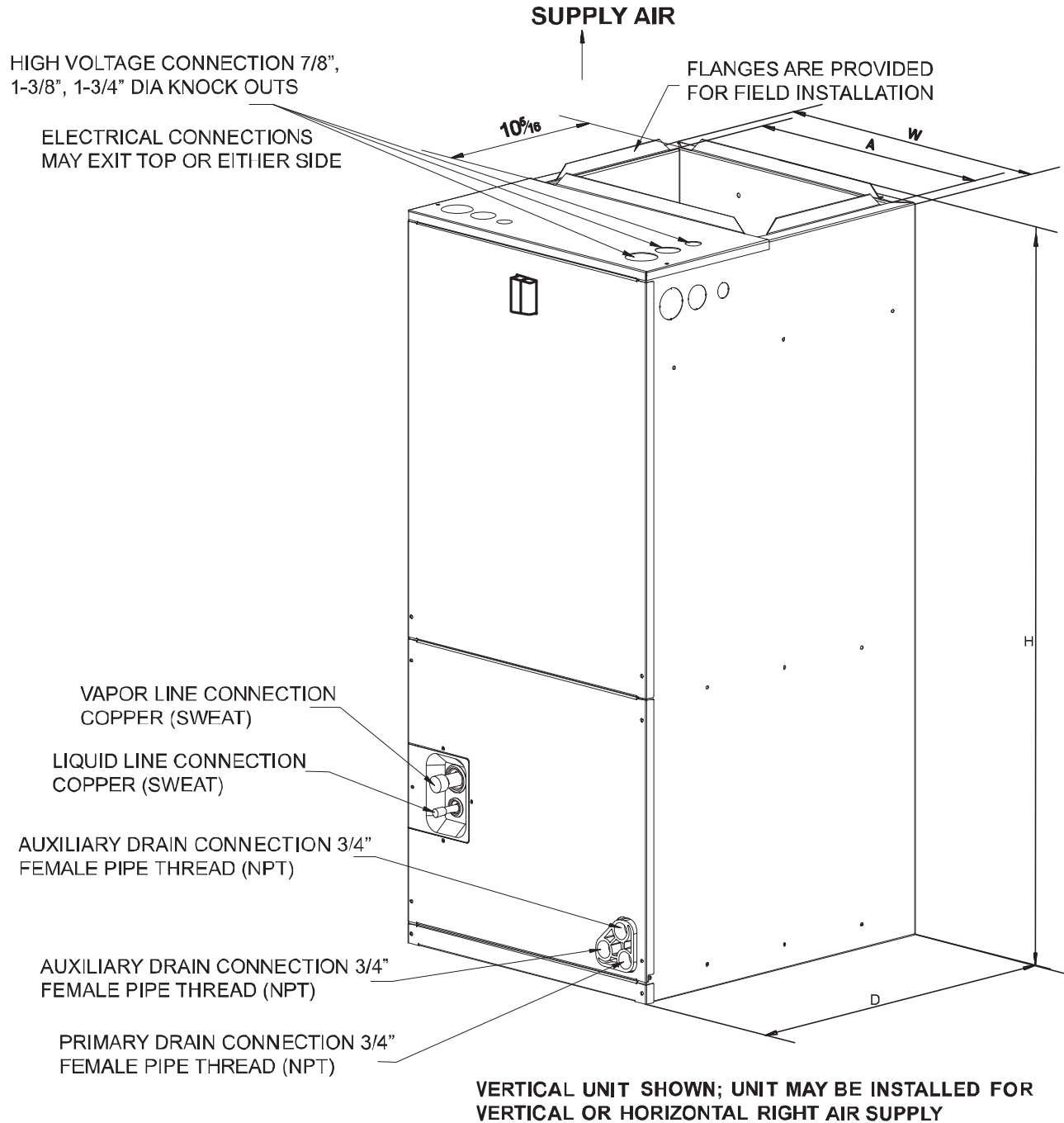
NUMBER	SYMBOL	NAME
1	T1	Room temperature sensor
2	T2A	Inlet pipe temperature sensor
3	T2B	Outlet pipe temperature sensor
4	EEV	Electronic expansion valve

Table 7 —Gas / Liquid Line Sizes

MODEL	GAS	LIQUID
40VMV012---3	1/2	1/4
40VMV018/024/030/036/048/054---3	5/8	3/8

DIMENSIONS

NOTE: 25" CLEARANCE IS REQUIRED IN THE FRONT OF THE UNIT FOR FILTER AND COIL MAINTENANCE.



NOTE: All dimensions are shown in inches.

Fig. 2 —40VMV012/018/024/030/036/048/054---3

Table 8 —Dimensions (40VMV012/018/024/030/036/048/054---3)

MODEL	A	B	C	D
40VMV012/018/024/030---3	46-1/2	19-5/8	21-5/8	18
40VMV036/048/054---3	54-1/2	22	24	19-1/2

WIRING DIAGRAM

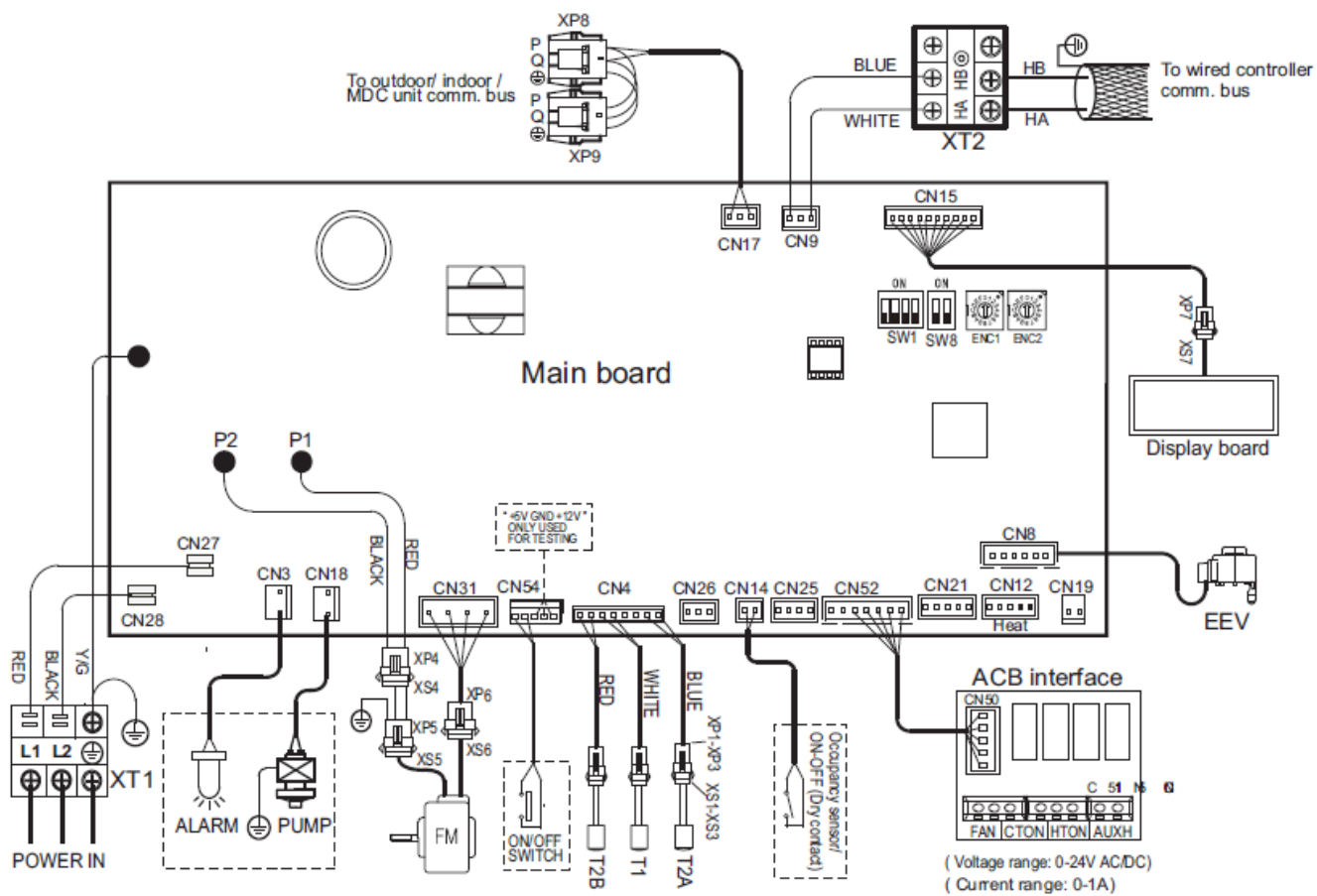


Fig. 3 —Wiring Diagram (40VMV012/018/024/030/036/048/054---3)

Wiring Diagram Definitions and Settings (40VMV012/018/024/030/036/048/054---3)

Table 9 —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
XP1-9	Connectors
XS1-7	
XT1-2	Terminal
PUMP	Pump motor
CS	Condensate switch

Table 10 —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 between indoor unit and 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 11 —ENC1 Definition

	(Reserved)
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Table 12 —J1 Definition

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

Table 13 —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 14 —SW8 Definitions

	Reserved
	Reserved

Table 15 —ENC2 Definitions

	Reserved
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Table 16 —0/1 Definition

	Means 0
	Means 1

ELECTRICAL CHARACTERISTICS

Table 17 —Electrical Characteristics

MODEL	POWER SUPPLY					IFM	
	HZ	VOLTZ	VOLTAGE RANGE	MCA	MOCP	KW	FLA
40VMV012---3	60	208/230V	Max.253V Min.187V	1. 50	15	0.10	1.20
40VMV018---3				3.80	15	0.37	3.00
40VMV024---3				3.80	15	0.37	3.00
40VMV030---3				3.80	15	0.37	3.00
40VMV036---3				5.30	15	0.56	4.20
40VMV048---3				5.30	15	0.56	4.20
40VMV054---3				7.20	15	0.56	5.70

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:

FAN PERFORMANCE

The Air Handling Unit has constant CFM motors that automatically regulate the rotating speed if the actual air flow deviates beyond 10% of the set CFM.

The following figures show fan characteristics at High-speed, Medium-speed, and Low-speed.

The unit can automatically adjust the external static pressure (ESP) between 0 – 0.8 inches. When the ESP is over 0.8 inches WG, the air flow drastically decreases.

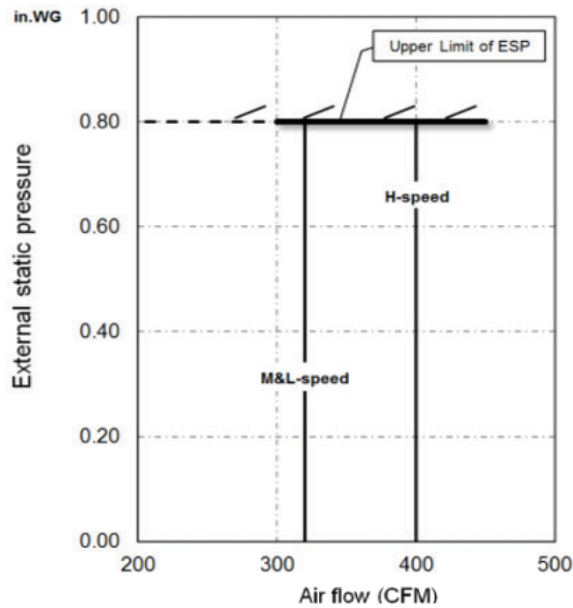


Fig. 4 —40VMV012---3

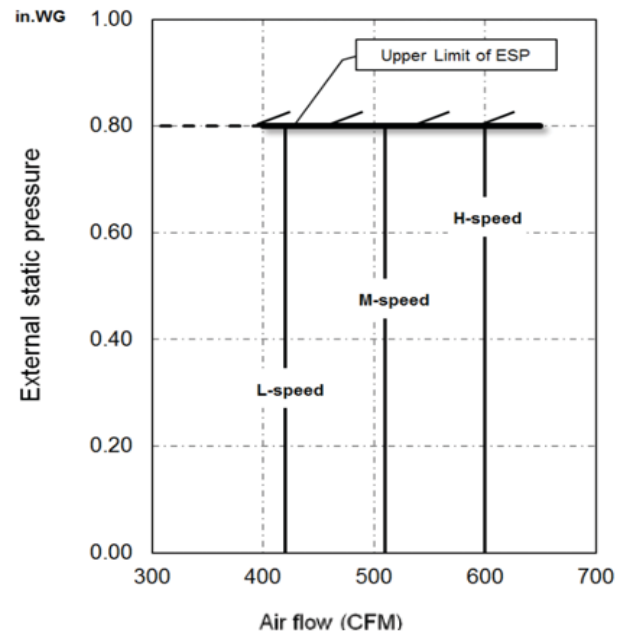


Fig. 5 —40VMV018---3

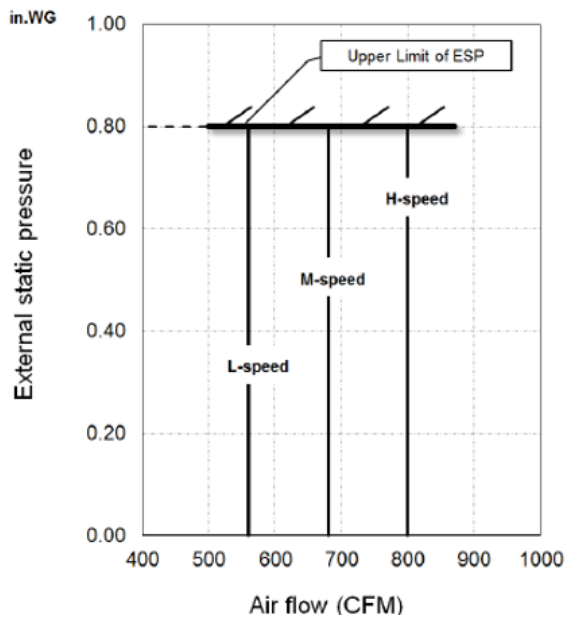


Fig. 6 —40VMV024---3

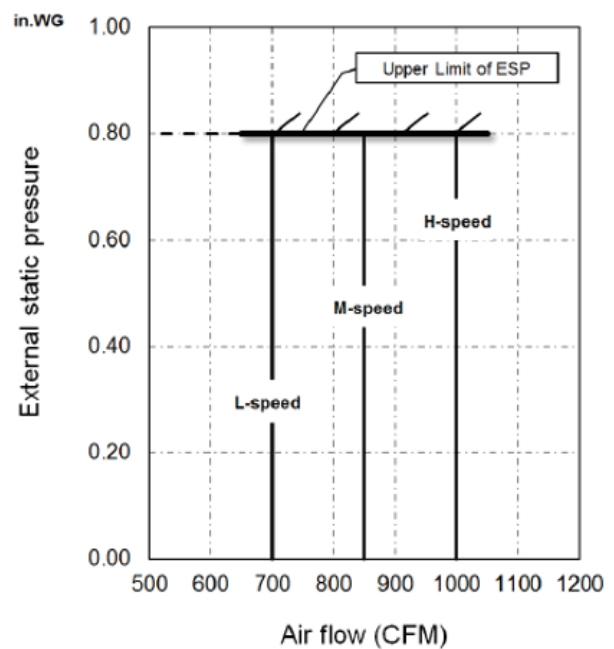


Fig. 7 —40VMV030---3

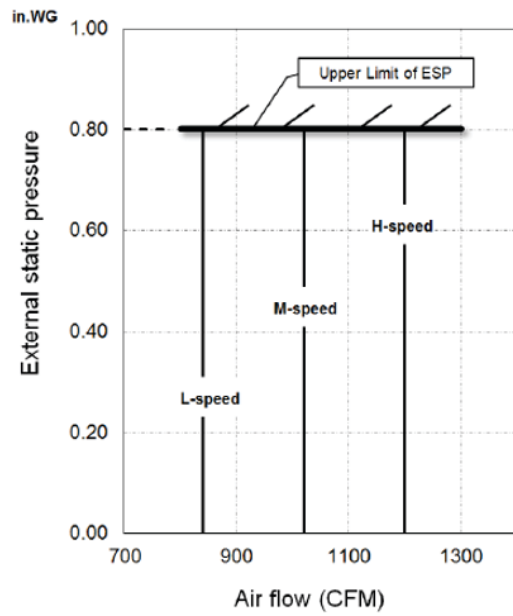


Fig. 8 —40VMV036---3

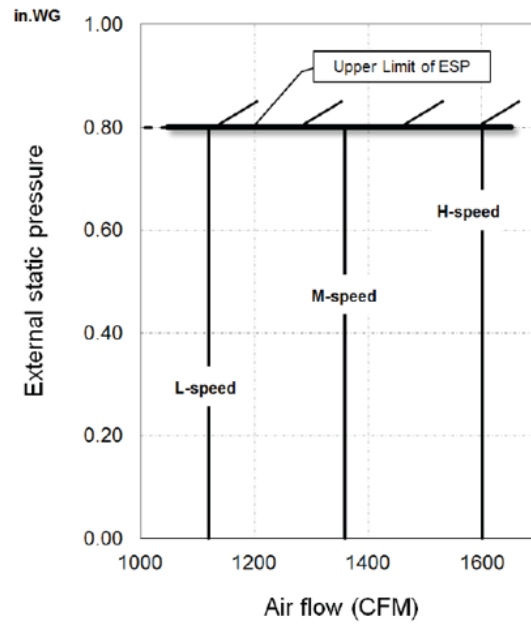


Fig. 9 —40VMV048---3

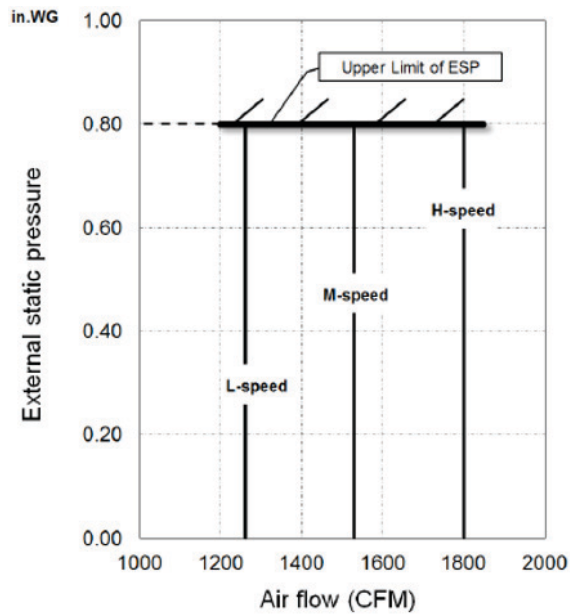


Fig. 10 —40VMV054---3

SOUND DATA

Sound Pressure Levels

Two installation types are available for 40VMV series. The following table shows the maximum noise data in High/Medium/Low speed respectively under different modes (i.e. Heating, Cooling and Fan).

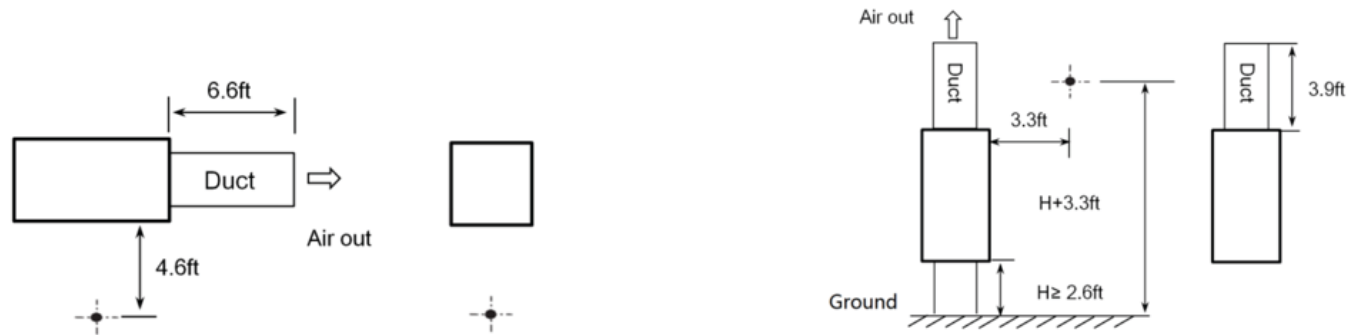


Fig. 11 —Overall Sound Levels

Table 18 —Fan Speed

MODEL	H	M	L
40VMV012---3	37.6	34.5	34.5
40VMV018---3	41.6	37.1	34.4
40VMV024---3	46.2	42.3	37.9
40VMV030---3	52.2	48.4	44.4
40VMV036---3	46.9	44.1	39.3
40VMV048---3	53.0	48.5	43.8
40VMV054---3	57.1	52.6	47.9

Units are dB(A)

NC Curves

NOTES:

External Static Pressure: 0.18 in. (45Pa)

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

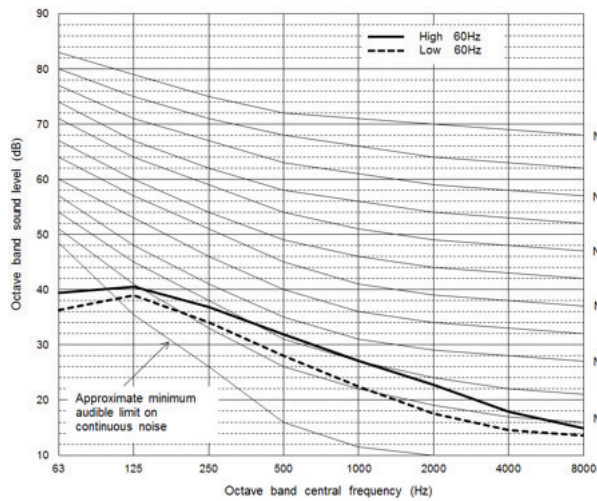


Fig. 12 —40VMV012---3

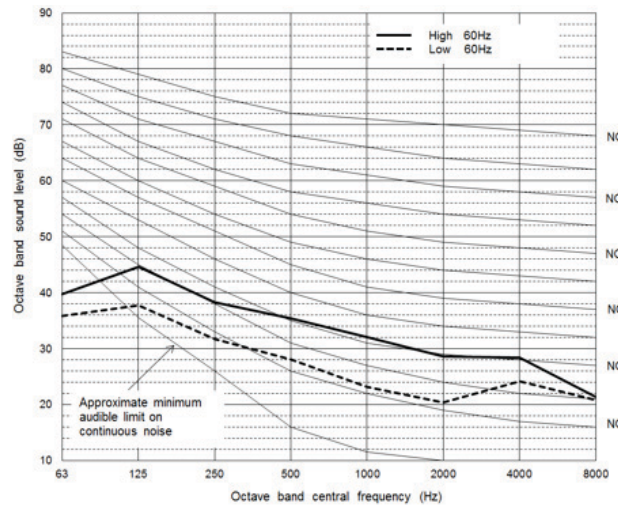


Fig. 13 —40VMV018---3

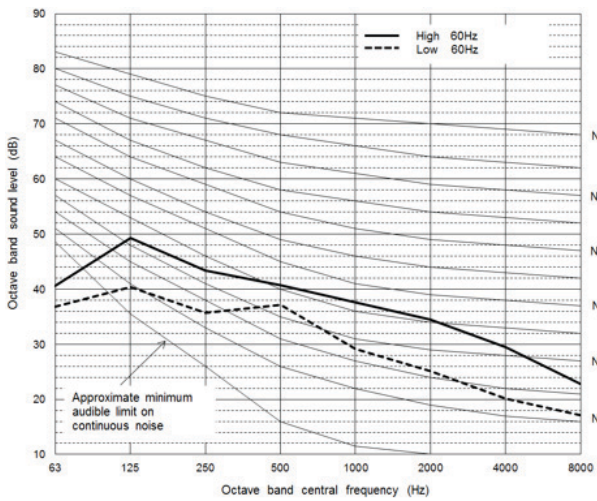


Fig. 14 —40VMV024---3

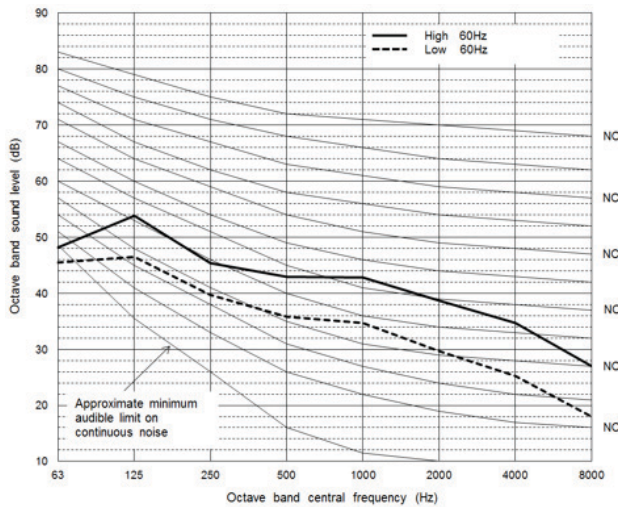


Fig. 15 —40VMV030---3

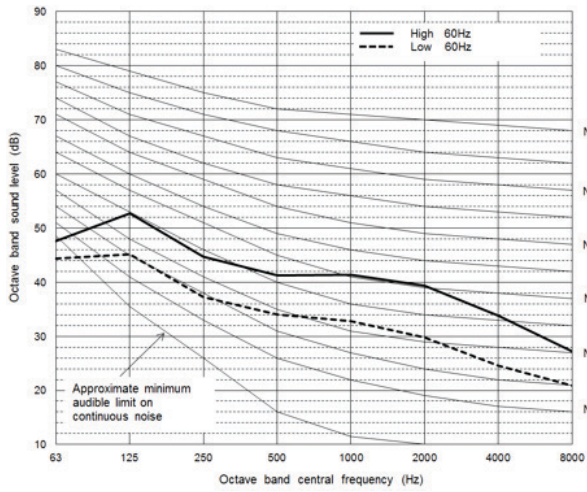


Fig. 16 —40VMV036---3

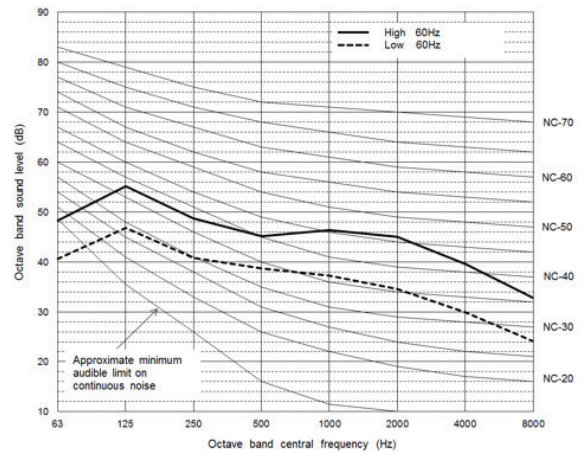


Fig. 17 —40VMV048---3

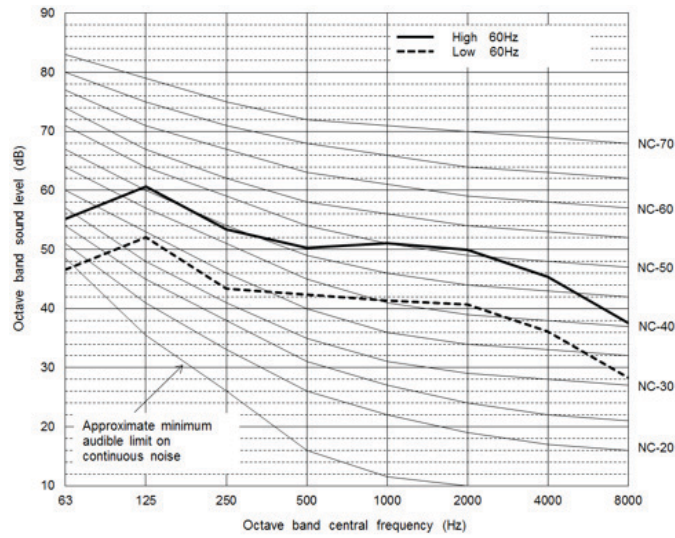


Fig. 18 —40VMV054---3

CAPACITY DATA TABLES

Table 19 —Cooling Capacity

INDOOR UNIT ENTERING AIR CONDITIONS:		COOLING CAPACITY INDICATION													
		12K		18K		24K		30K		36K		48K		53.5K	
drybulb(°F)	wetbulb(°F)	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
70	58	7.54	6.59	11.31	9.86	15.07	13.06	18.84	15.8	22.61	19.78	30.15	25.75	33.6	28.57
70	62	9.52	5.99	14.28	8.96	19.04	11.85	23.8	14.47	28.56	17.8	38.08	23.17	42.45	25.6
70	67	12	5.09	18	7.61	24	10.05	30	12.45	36	14.88	48	19.36	53.5	21.21
70	72	/	/	/	/	/	/	/	/	/	/	/	/	/	/
70	76	/	/	/	/	/	/	/	/	/	/	/	/	/	/
75	58	7.59	7.54	11.39	11.31	15.18	15.07	18.97	18.84	22.77	22.61	30.36	30.15	33.84	33.60
75	62	9.59	7.53	14.38	11.27	19.17	14.94	23.97	18.13	28.76	22.62	38.35	29.53	42.75	32.80
75	67	12.08	6.63	18.13	9.91	24.17	13.13	30.21	16.10	36.25	19.68	48.34	25.70	53.87	28.40
75	72	12.99	4.93	12.99	7.37	12.99	9.74	12.99	12.08	12.99	14.41	12.99	18.75	12.99	20.54
75	76	/	/	/	/	/	/	/	/	/	/	/	/	/	/
80	58	7.65	7.54	11.47	11.31	15.28	15.07	19.10	18.84	22.93	22.61	30.57	30.15	34.07	33.60
80	62	9.65	9.07	14.48	13.58	19.31	18.02	24.13	21.80	28.96	27.44	38.61	35.90	43.05	40.02
80	67	12.17	8.17	18.25	12.23	24.34	16.21	30.42	19.76	36.51	24.50	48.67	32.06	54.25	35.61
80	72	13.08	6.47	13.08	9.68	13.08	12.82	13.08	15.73	13.08	19.22	13.08	25.10	13.08	27.74
80	76	13.79	5.08	13.79	7.59	13.79	10.03	13.79	12.41	13.79	14.88	13.79	19.38	13.79	21.26
85	58	7.70	7.54	11.55	11.31	15.39	15.07	19.24	18.84	23.09	22.61	30.79	30.15	34.31	33.60
85	62	9.72	9.52	14.58	14.28	19.44	19.04	24.30	23.80	29.16	28.56	38.89	38.08	43.35	42.45
85	67	12.25	9.71	18.38	14.54	24.51	19.30	30.63	23.43	36.76	29.33	49.02	38.44	54.63	42.83
85	72	13.17	8.01	13.17	11.99	13.17	15.90	13.17	19.39	13.17	24.04	13.17	31.47	13.17	34.95
85	76	13.89	6.62	13.89	9.90	13.89	13.12	13.89	16.07	13.89	19.70	13.89	25.74	13.89	28.47
90	58	7.75	7.54	11.63	11.31	15.50	15.07	19.37	18.84	23.25	22.61	31.00	30.15	34.55	33.60
90	62	9.79	9.52	14.68	14.28	19.58	19.04	24.47	23.80	29.37	28.56	39.16	38.08	43.65	42.45
90	67	12.34	12.00	18.51	18.00	24.68	24.00	30.85	30.00	37.02	36.00	49.36	48.00	55.01	53.50
90	72	13.26	9.56	13.26	14.31	13.26	19.00	13.26	23.06	13.26	28.88	13.26	37.85	13.26	42.18
90	76	13.98	8.16	13.98	12.22	13.98	16.20	13.98	19.74	13.98	24.53	13.98	32.11	13.98	35.70

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

Table 20 —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
AHU	12	14.31	14.04	13.77	13.50	12.60	11.99	11.39	10.49
	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
	54	63.62	62.41	61.21	60.00	55.98	53.30	50.63	46.61

Rated Condition: Condensation temperature is 114.8°F.

TC = Total capacity; KBTU/h

SC = Sensible capacity; KBTU/h