

40VMV
Vertical Air Handling Indoor Unit for
Variable Refrigerant Flow (VRF) Systems

Engineering Data Book



Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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I. Vertical Air Handling Unit Basic information

1. Specifications

Table 1 – Data Table

Model Name			40VMV012---3	40VMV018---3
Power Source		V-Ph-Hz	208/230-1-60	
Capacity Cooling*1		Btu/h	12,000	18,000
Capacity Heating*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	
Filter			Included	
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data	
	Control Wiring	AWG	2-core shielded twisted pair cable 16AWG – 20AWG	

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

NOTES:

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		
Capacity Cooling*1			Btu/h	24,000		30,000
Capacity Heating*1			Btu/h	27,500		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		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			
Filter			Included			
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data			
	Control Wiring	AWG	2-core shielded twisted pair cable 16AWG – 20AWG			

*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.

NOTES:

Table 3 – Data Table

Model Name			40VMV036---3		40VMV048---3	
Power Source			V-Ph-Hz	208/230-1-60		
Capacity Cooling*1			Btu/h	36,000		48,000
Capacity Heating*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		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	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			
Filter			Included			
Wiring	Power Wiring		AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data		
	Control Wiring		AWG	2-core shielded twisted pair cable 16AWG – 20AWG		

*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.

NOTES:

Table 4 – Data Table

Model Name			40VMV054---3
Power Source		V-Ph-Hz	208/230-1-60
Capacity Cooling*1		Btu/h	53,500
Capacity Heating*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
Filter			Included
Wiring	Power Wiring	AWG	Sized per NEC and Local Codes based on Nameplate Electrical Data
	Control Wiring	AWG	2-core shielded twisted pair cable 16AWG – 20AWG

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

NOTES: 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.

2. 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 drain pan outlet
Wire grommet	2		Wire routing
Tie rope	3		-----
Screw	4		-----
PQE connection wire	2		Connects the outdoor unit, indoor unit, and sub MDC.
Connection wire	1		For occupancy sensor

MDC: Multiport Distribution Controller

II. Piping Diagram

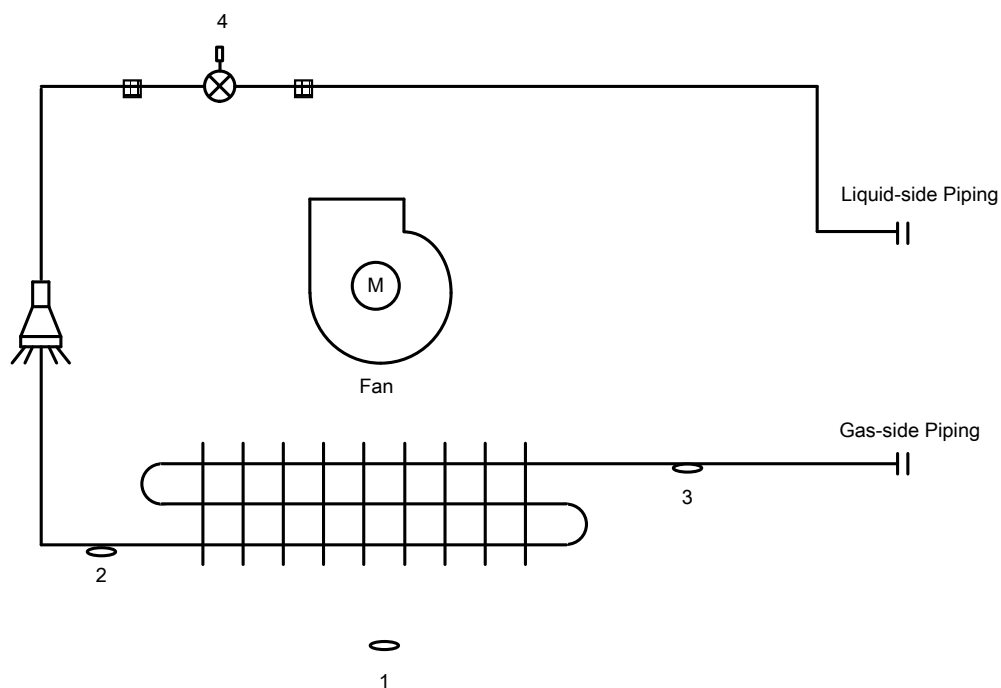


Figure 1 – Piping

Table 6 – 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 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

III. Dimensions

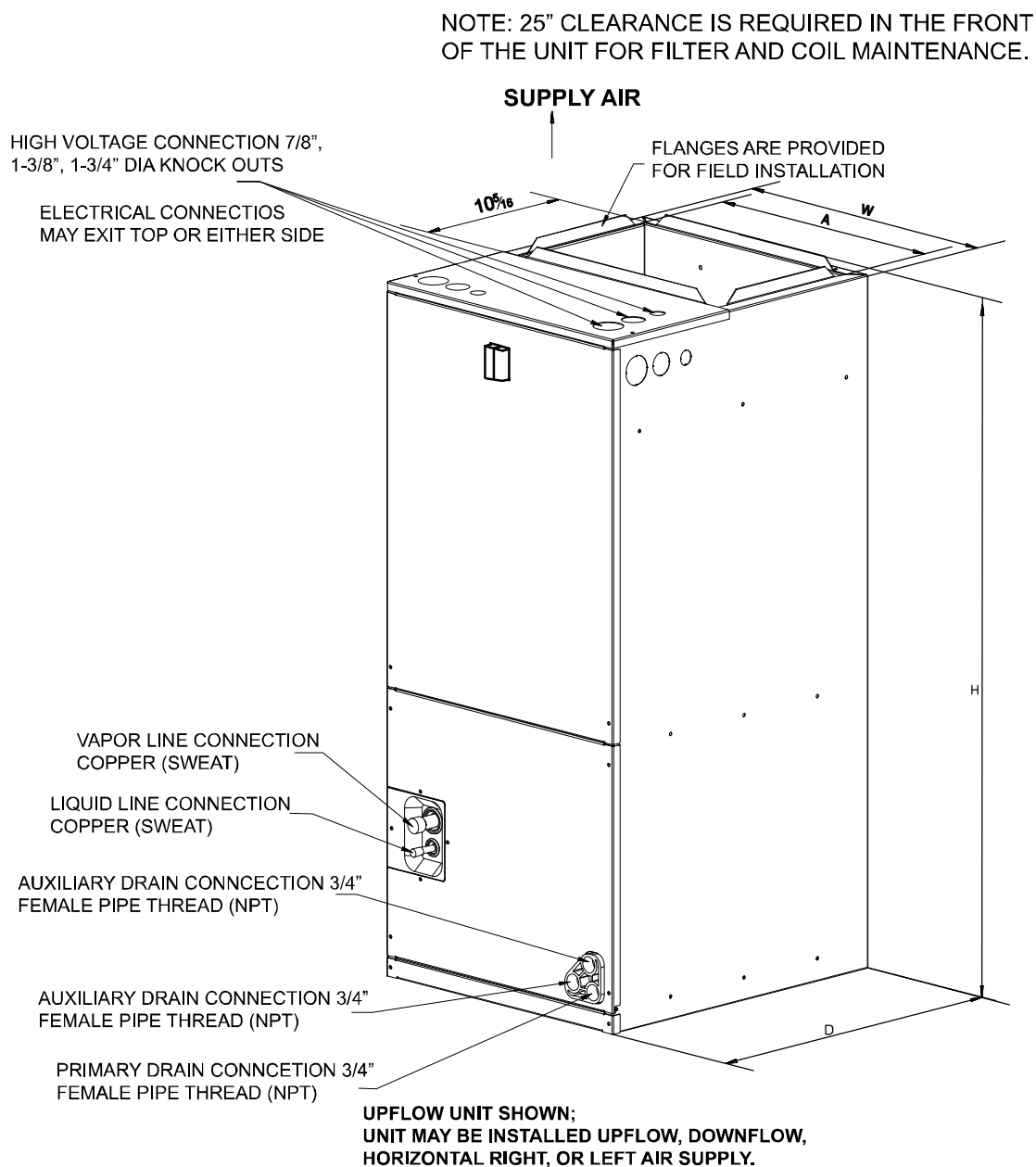


Figure 2 – 40VMV012/018/024/030/036/048/054---3

Table 8 – Dimensions

Model	H	W	D	Duct "A"
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

NOTE: Dimensions are in inches.

IV. Wiring Diagram

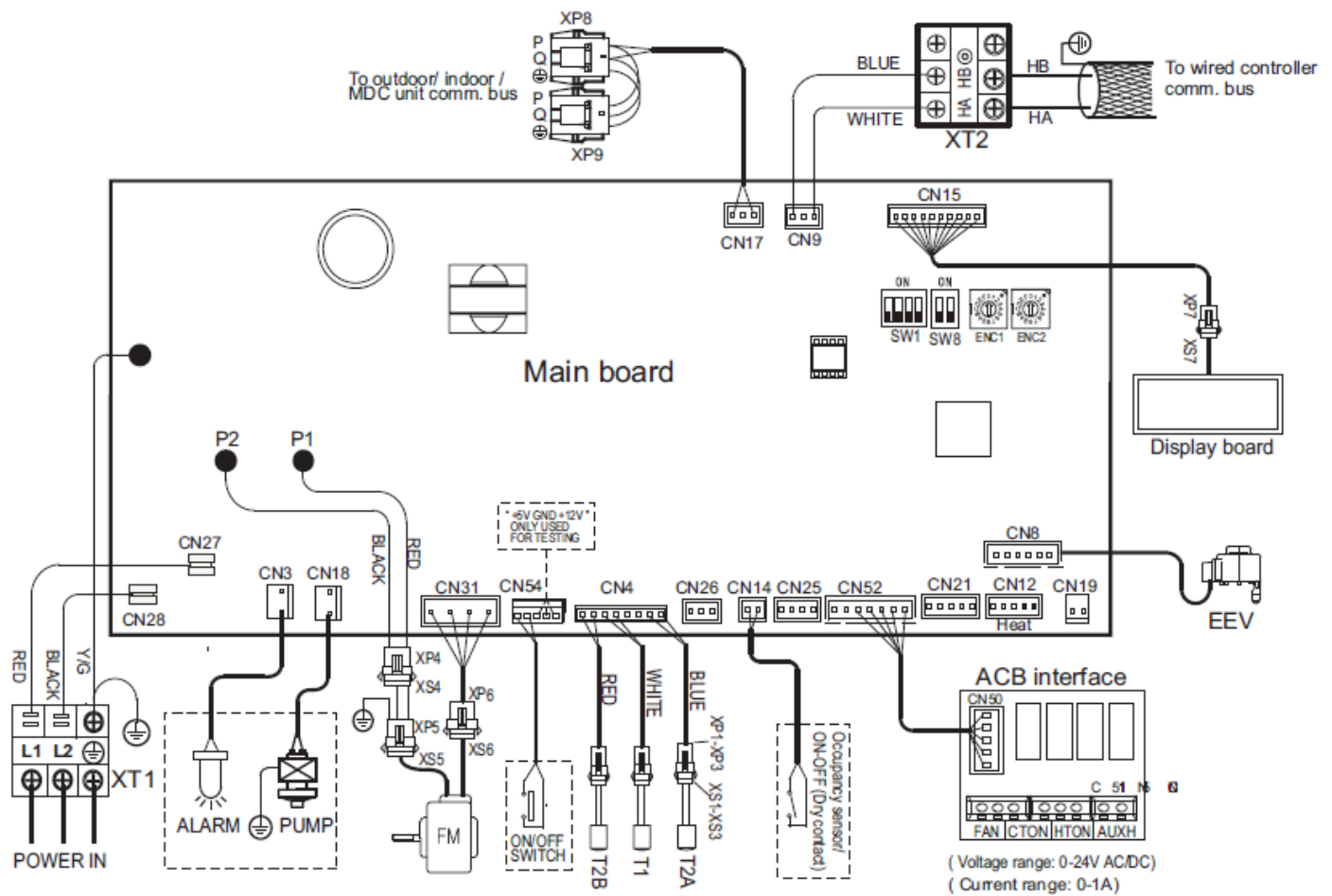


Figure 3 – Wiring Diagram (40VMM012/018/024/030/036/048/054---3)

Legend:

ALARM	– Warning Lamp (Optional)	PUMP	– Pump Motor
AUXH	– Output for Auxiliary Heat	T1	– Room Temperature Sensor
CTON	– Output for Cooling Operation	T2A	– Inlet Pipe Temperature Sensor
EEV	– Electronic Expansion Valve	T2B	– Evap. Outlet Temperature in Cooling Mode
FAN	– Output for Fan Operation	XP1-9	– Connector
FM	– Indoor Fan Motor	XS1-7	– Connector
HTON	– Output for Heating Operation	XT1-2	– Terminal Block
MDC	– Multiport Distribution Controller	-----	– Optional Component or Field Wiring

Wiring Diagram Definitions and Settings (40VMV012/018/024/030/036/048/054---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
XP1-9	Connectors
XS1-7	
XT1-2	Terminal
PUMP	Pump Motor
CS	Condensate Switch

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

	Reserved		Reserved
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Table 13 – 0/1 Definition

	Means 0		Means 1
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Table 12 – J1 Definition

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

Table 14 – SW8 Definition

	(Reserved)
	(Reserved)

Table 15 – Error Code / Content

Error Code	Error Content
dd	Heating/Cooling Conflict
E1	Comm. Error with Outdoor Unit
E2	Temp Sensor (T1) Error
E4	Temp Sensor (T2B) Error
E5	Temp Sensor (T2A) Error
E6	DC Fan Error
E7	EEPROM Error (Data Storage)
UU	MDC Error in Auto System-Check Mode
E9	Comm. 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 Power on for the first time

V. Electrical Characteristics

Table 16– Electrical Characteristics

Model	Power supply					IFM	
	Hz	Volts	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) (See Notes 3 and 4)

MOCP: Maximum Overcurrent Protection (A)

Symbols:

kW : Fan Motor Rated Output (KW)

FLA : Full Load Amps (A)

IFM : Indoor Fan Motor

VI. 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.

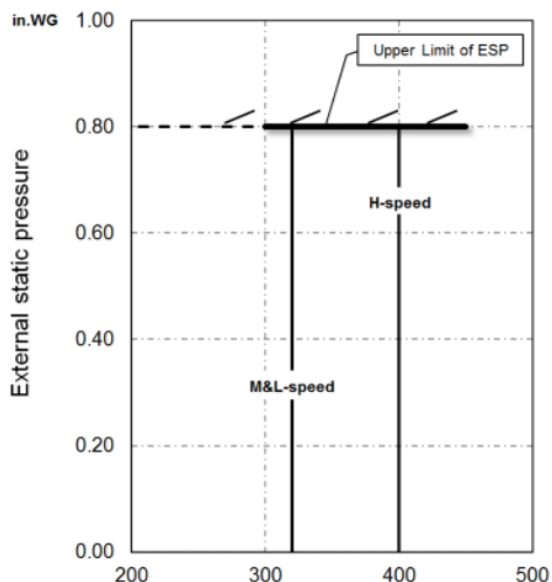


Figure 4 – 40VMV012---3

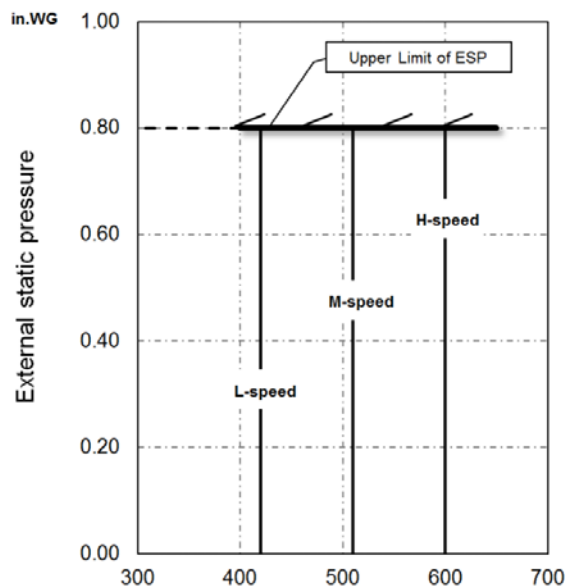


Figure 5 – 40VMV018---3

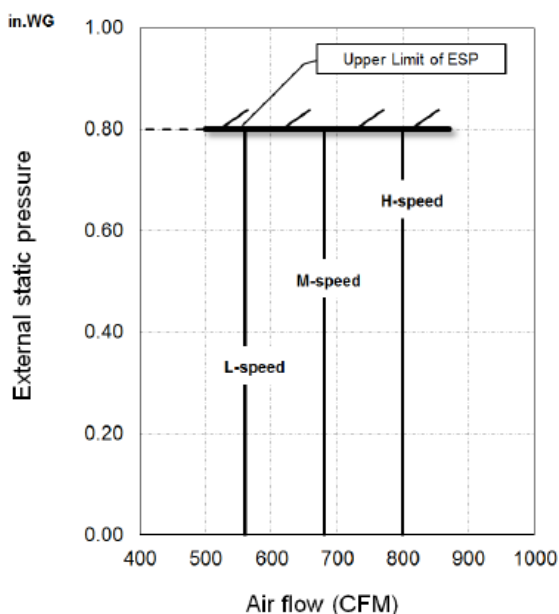


Figure 6 – 40VMV024---3

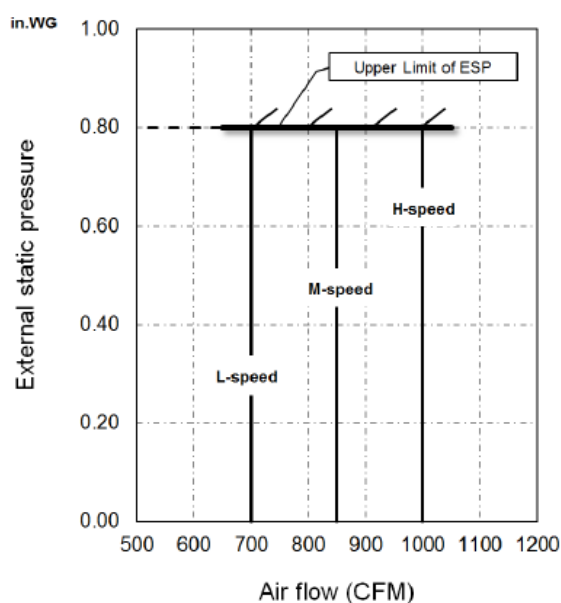


Figure 7 – 40VMV030---3

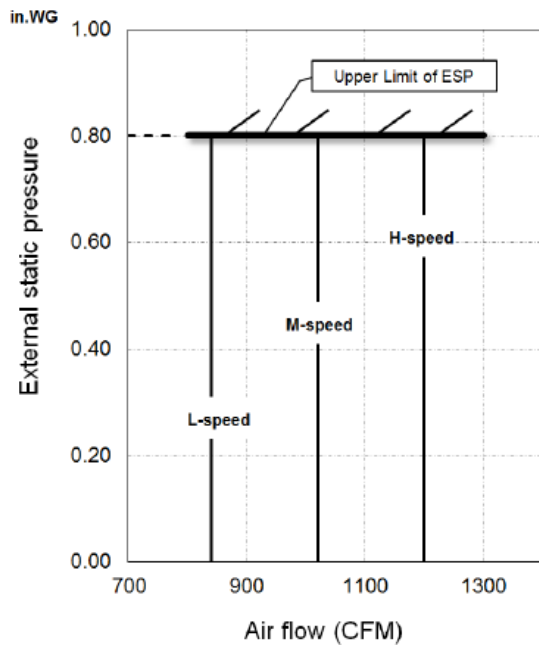


Figure 8 – 40VMV036---3

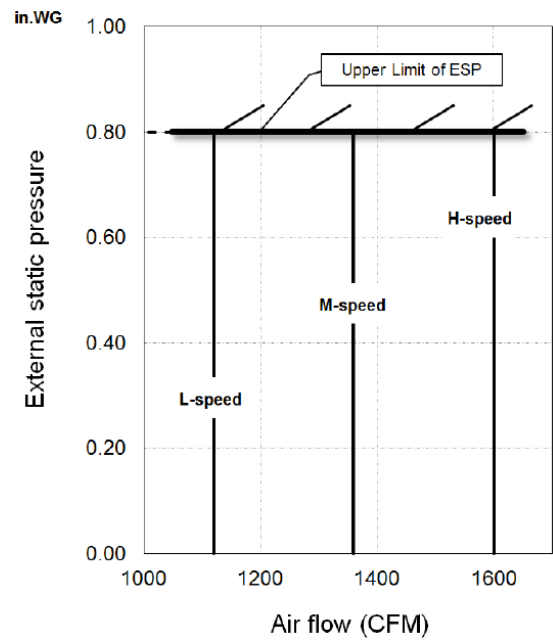


Figure 9 – 40VMV048---3

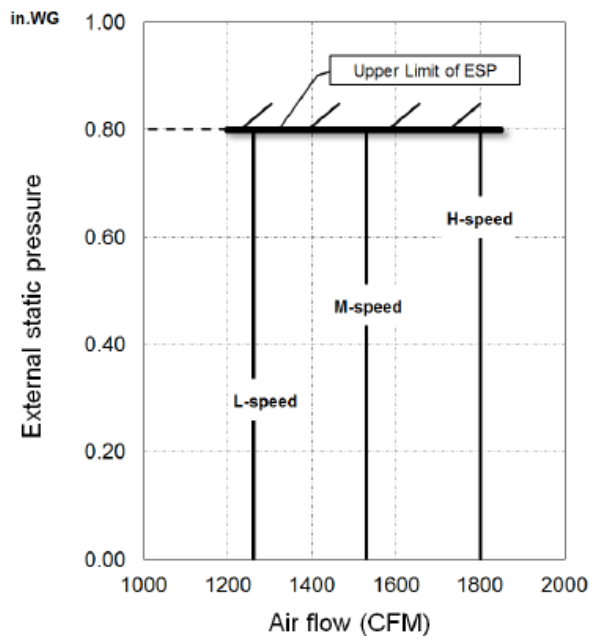


Figure 10 – 40VMV054---3

VII. Sound Data

1. 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).



Figure 11 – Overall Sound Levels

Table 17 – 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

NOTE: Units are dB(A)

2. NC Curves

NOTES:

External Static Pressure: 0.18 in. (45Pa)

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

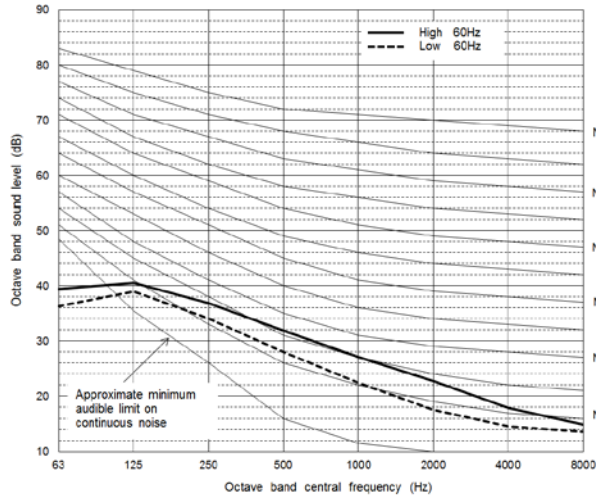


Figure 12 – 40VMV012---3

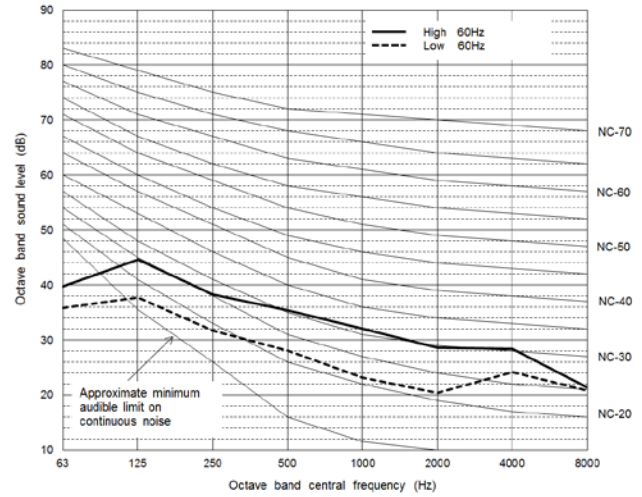


Figure 13 – 40VMV018---3

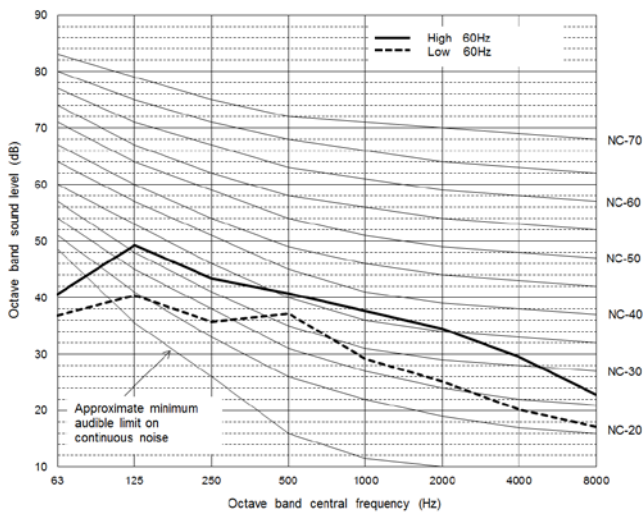


Figure 14 – 40VMV024---3

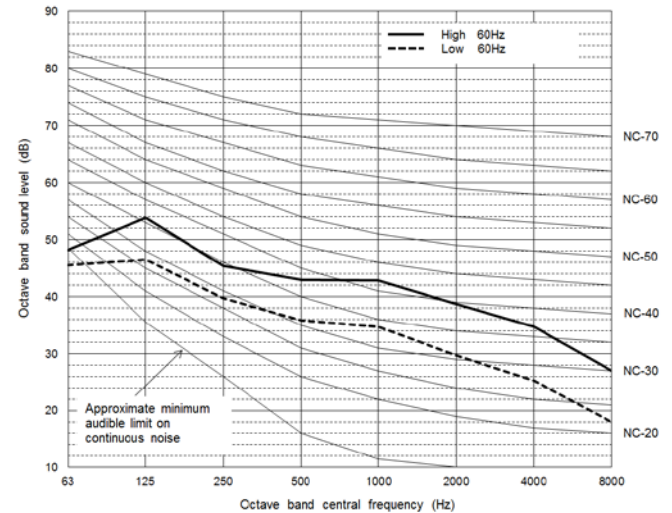


Figure 15 – 40VMV030---3

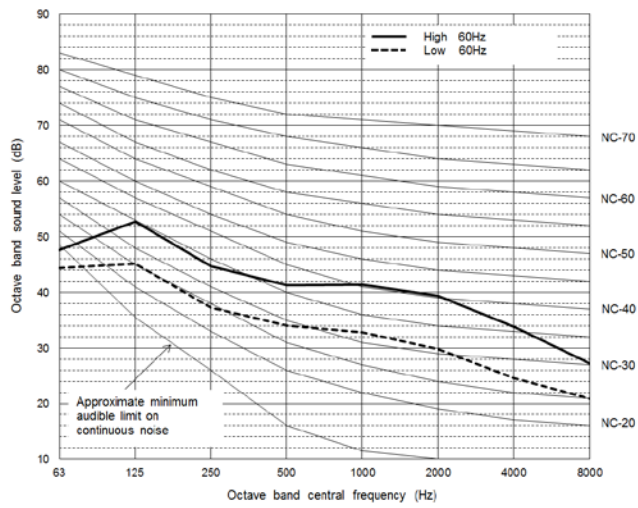


Figure 16 – 40VMV036---3

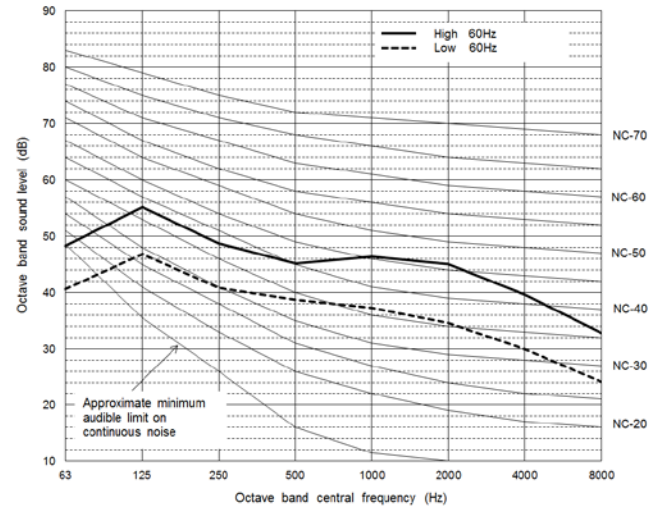


Figure 17 – 40VMV048---3

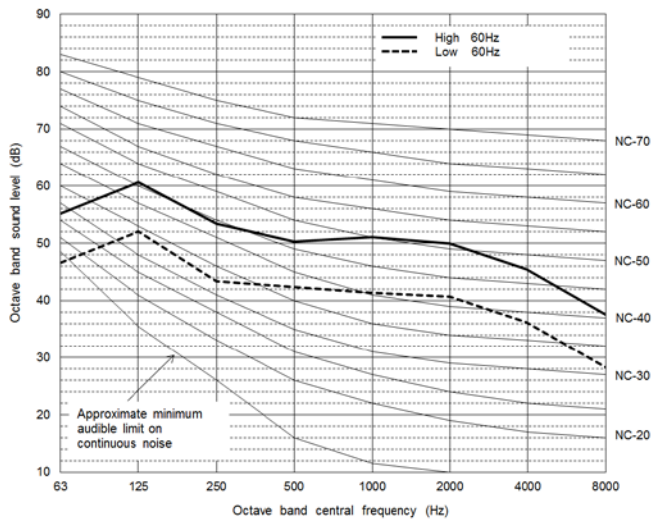


Figure 18 – 40VMV054---3

VIII. Capacity Data Tables

Table 18 – 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
Model	12	7.04	6.56	8.53	7.04	10.02	7.85	12.00	8.71	12.79	8.99	13.59	9.23
	18	10.56	9.72	12.79	10.43	15.02	11.65	18.00	12.94	19.19	13.37	20.38	13.74
	24	14.08	12.98	17.06	13.92	20.03	15.55	24.00	17.27	25.59	17.84	27.17	18.33
	30	17.60	16.09	21.32	17.27	25.04	19.31	30.00	21.46	31.98	22.17	33.97	22.79
	36	21.12	19.91	25.59	21.33	30.05	23.77	36.00	26.34	38.38	27.18	40.76	27.90
	48	28.17	25.91	34.12	27.80	40.07	31.07	48.00	34.50	51.17	35.63	54.35	36.61
	54	31.39	28.78	38.02	30.88	44.66	34.54	53.50	38.37	57.04	39.67	60.57	40.77

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

Table 19 – 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
Model	12	14.31	14.04	13.77	13.50	12.60	11.99
	18	22.27	21.84	21.42	21.00	19.59	18.66
	24	28.63	28.08	27.54	27.00	25.19	23.99
	30	36.05	35.37	34.68	34.00	31.72	30.21
	36	42.41	41.61	40.80	40.00	37.32	35.54
	48	57.25	56.17	55.08	54.00	50.38	47.97
	54	63.62	62.41	61.21	60.00	55.98	53.30

Rated Condition: Condensation temperature is 114.8°F.

TC = Total capacity; KBTU/h

SC = Sensible capacity; KBTU/h

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