45VML---3
Sizes 5K-36K
Low Static Ducted for Variable Refrigerant Flow (VRF)

Engineering Databook

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Fig. 1 —Unit Image

NOTE: Carrier is committed to continuously improving its products to ensure the highest quality and reliability standards, and to meet local regulations and market requirements. All features and specifications are subject to change without prior notice.

SPECIFICATIONS

Table 1 — Specifications (Sizes 5K-9K)

Model			45VML05	45VML07	45VML09
Power supply			1-phase, 208/230V, 60Hz		
Cooling[1]	Capacity	kW	1.5	2.1	2.6
		kBtu/h	5	7	9
	Power input	W	30	30	32
Heating[2]	Capacity	kW	1.8	2.3	2.9
		kBtu/h	6	8	10
	Power input	W	30	30	32
Fan motor type			DC		
Indoor coil	Number of rows[3]		2&3	2&3	2&3
	Tube pitch[3]	In.	9/16/ 11/16		
	Fin spacing and type	fins/in.	19 Hydrophilic aluminum		
	Tube OD and type	In.	Φ3/16 Inner-groove		
	Dimensions (L×H×W)	In.	14-15/16×6-11/16×3-3/4		20-7/8×6-11/16×3-3/4
	Number of circuits		4	4	4
Air flow rate[4]		cfm	296/275/255/234/213/ 193/172	325/300/275/250/225/ 200/175	343/316/288/261/233/ 206/178
External static pressure[5]		in.wg	0.04(0-0.2)		
Sound pressure level[6]		dB(A)	32/30/28.5/27.5/26.5/ 25.5/25	32/30/28.5/27.5/26.5/ 25.5/25	33/31/29/28/26/24/23
Unit	Net dimensions[7] (W×H×D)	In.	21-5/8×7-13/16×18-7/8		27-9/16×7-13/16×18-7/8
	Packed dimensions (W×H×D)	In.	31-11/16×10-13/16×24-3/16		37-5/8×10-13/16× 24-3/16
	Net/Gross weight	Lbs	27.6/38.6		32/44.1
Refrigerant type			R454B		
Throttle type			Electronic expansion valve		
Design pressure (H/L)		MPa	4.4/2.6		
Pipe connections	Liquid/Gas pipe	In.	Φ1/4/Φ1/2		
	Drain pipe	In.	OD Φ1		

NOTES:

1. Indoor temperature 80°DB, 67°WB; outdoor temperature 95°DB, 75°WB; equivalent refrigerant piping length 295-1/4in. with zero level difference.
2. Indoor temperature 70°DB, 60°WB; outdoor temperature 47°DB, 43°WB; equivalent refrigerant piping length 295-1/4in. with zero level difference.
3. Low Static Pressure Duct adopts a brand-new special-shaped heat exchanger with different number of rows and different Tube pitch at different positions.
4. Fan motor speed and air flow rate are from the highest speed to the lowest speed, total 7 rates for each model.
5. Stable operation external static pressure range. (Note: setting external static pressure outside the unit's optimal static pressure range may lead to higher noise levels and lower airflow rate. For the optimal external static pressure range refer to the unit's installation manual.)
6. Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 59-1/16in. below the unit in an anechoic chamber.
7. The dimension is only the body size, excluding the size of the installation lug, connecting copper pipe, etc. For detailed dimensions, please refer to the installation manual.

Table 2 — Specifications (Sizes 12K-18K)

Model			45VML12	45VML15	45VML18
Power supply			1-phase, 208/230V, 60Hz		
Cooling[1]	Capacity	kW	3.5	4.4	5.3
		kBtu/h	12	15	18
	Power input	W	55	54	67
Heating[2]	Capacity	kW	4	5	6.2
		kBtu/h	13.5	17	21
	Power input	W	55	54	67
Fan motor type			DC		
Indoor coil	Number of rows[3]		2&3	2&3	2&3
	Tube pitch[3]	In.	9/16/ 11/16		
	Fin spacing and type	fins/in.	19 Hydrophilic aluminum		
	Tube OD and type	In.	Φ3/16 Inner-groove		
	Dimensions (L×H×W)	In.	20-7/8×6-11/16×3-3/4	28-3/4×6-11/16×3-3/4	
	Number of circuits		4	6	6
Air flow rate[4]		cfm	396/362/327/293/258/224/189	473/437/400/364/327/ 291/254	533/491/448/406/363/ 321/278
External static pressure[5]		in.wg	0.04(0-0.2)		
Sound pressure level[6]		dB(A)	37.5/35/32/29/26/24/22	36/32.5/30.5/28/25.5/ 23/21.5	39/36/33.5/31.5/30/28/26
Unit	Net dimensions[7] (W×H×D)	In.	27-9/16×7-13/16×18-7/8	35-7/16×7-13/16×18-7/8	
	Packed dimensions (W×H×D)	In.	37-5/8×10-13/16×24-3/16	45-1/2×10-13/16×24-3/16	
	Net/Gross weight	Lbs	32/44.1	39.7/52.9	
Refrigerant type			R454B		
Throttle type			Electronic expansion valve		
Design pressure (H/L)		MPa	4.4/2.6		
Pipe connections	Liquid/Gas pipe	In.	Φ1/4/Φ1/2		
	Drain pipe	In.	OD Φ1		

NOTES:

1. Indoor temperature 80°DB, 67°WB; outdoor temperature 95°DB, 75°WB; equivalent refrigerant piping length 295-1/4in. with zero level difference.
2. Indoor temperature 70°DB, 60°WB; outdoor temperature 47°DB, 43°WB; equivalent refrigerant piping length 295-1/4in. with zero level difference.
3. Low Static Pressure Duct adopts a brand-new special-shaped heat exchanger with different number of rows and different Tube pitch at different positions.
4. Fan motor speed and air flow rate are from the highest speed to the lowest speed, total 7 rates for each model.
5. Stable operation external static pressure range. (Note: setting external static pressure outside the unit's optimal static pressure range may lead to higher noise levels and lower airflow rate. For the optimal external static pressure range refer to the unit's installation manual.)
6. Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 59-1/16in. below the unit in an anechoic chamber.
7. The dimension is only the body size, excluding the size of the installation lug, connecting copper pipe, etc. For detailed dimensions, please refer to the installation manual.

Table 3 — Specifications (Sizes 24K-36K)

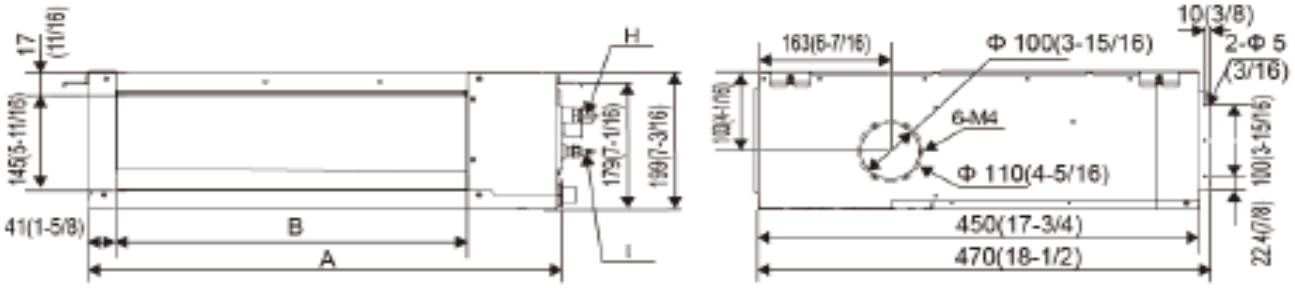
Model			45VML24	45VML30	45VML36
Power supply			1-phase, 208/230V, 60Hz		
Cooling[1]	Capacity	kW	7	8.8	10.6
		kBtu/h	24	30	36
	Power input	W	79	92	179
Heating[2]	Capacity	kW	7.9	10	11.7
		kBtu/h	27	34	40
	Power input	W	79	92	179
Fan motor type			DC		
Indoor coil	Number of rows[3]		2&3	2&3	2&3
	Tube pitch[3]	In.	9/16/ 11/16		
	Fin spacing and type	fins/in.	19 Hydrophilic aluminum		
	Tube OD and type	In.	Φ3/16 Inner-groove		
	Dimensions (L×H×W)	In.	15-3/4×13/16×3-3/4	55-5/16×6-11/16×3-3/4	
	Number of circuits		5	12	
Air flow rate[4]		cfm	657/605/552/500/448/ 395/343	858/810/761/713/665/616/ 568	1243/1142/1042/941/ 840/740/639
External static pressure[5]		in.wg	0.04(0-0.2)	0.08(0-0.2)	
Sound pressure level[6]		dB(A)	39/36/34/31.5/29/25/22	40/38/36.5/35.5/33.5/ 31.5/29	46.5/44/41.5/39.5/36.5/33.5/ 30.5
Unit	Net dimensions[7] (W×H×D)	In.	43-5/16×7-13/16×18-7/8	63×7-13/16×18-7/8	
	Packed dimensions (W×H×D)	In.	53-3/8×10-13/16×24-3/16	73×10-13/16×24-3/16	
	Net/Gross weight	Lbs	48.5/62.8	67.2/93.7	
Refrigerant type			R454B		
Throttle type			Electronic expansion valve		
Design pressure (H/L)		MPa	4.4/2.6		
Pipe connections	Liquid/Gas pipe	In.	Φ3/8/Φ5/8		
	Drain pipe	In.	OD Φ1		

NOTES:

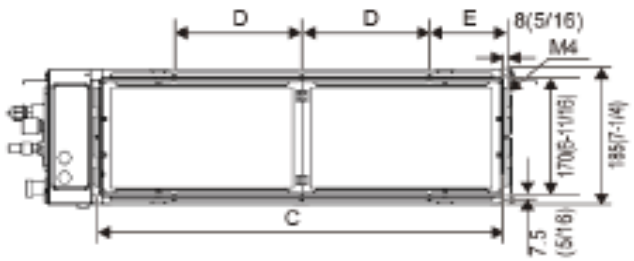
1. Indoor temperature 80°DB, 67°WB; outdoor temperature 95°DB, 75°WB; equivalent refrigerant piping length 295-1/4in. with zero level difference.
2. Indoor temperature 70°DB, 60°WB; outdoor temperature 47°DB, 43°WB; equivalent refrigerant piping length 295-1/4in. with zero level difference.
3. Low Static Pressure Duct adopts a brand-new special-shaped heat exchanger with different number of rows and different Tube pitch at different positions.
4. Fan motor speed and air flow rate are from the highest speed to the lowest speed, total 7 rates for each model.
5. Stable operation external static pressure range. (Note: setting external static pressure outside the unit's optimal static pressure range may lead to higher noise levels and lower airflow rate. For the optimal external static pressure range refer to the unit's installation manual.)
6. Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 59-1/16in. below the unit in an anechoic chamber.
7. The dimension is only the body size, excluding the size of the installation lug, connecting copper pipe, etc. For detailed dimensions, please refer to the installation manual.

DIMENSIONS

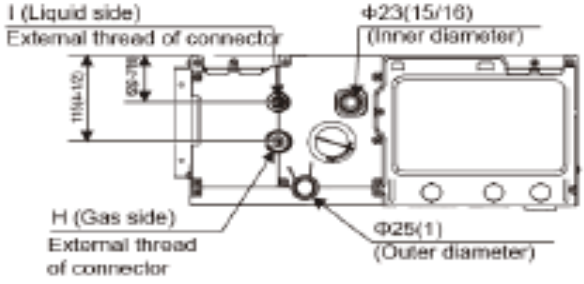
External dimension, air outlet size, and size of fresh air outlet:



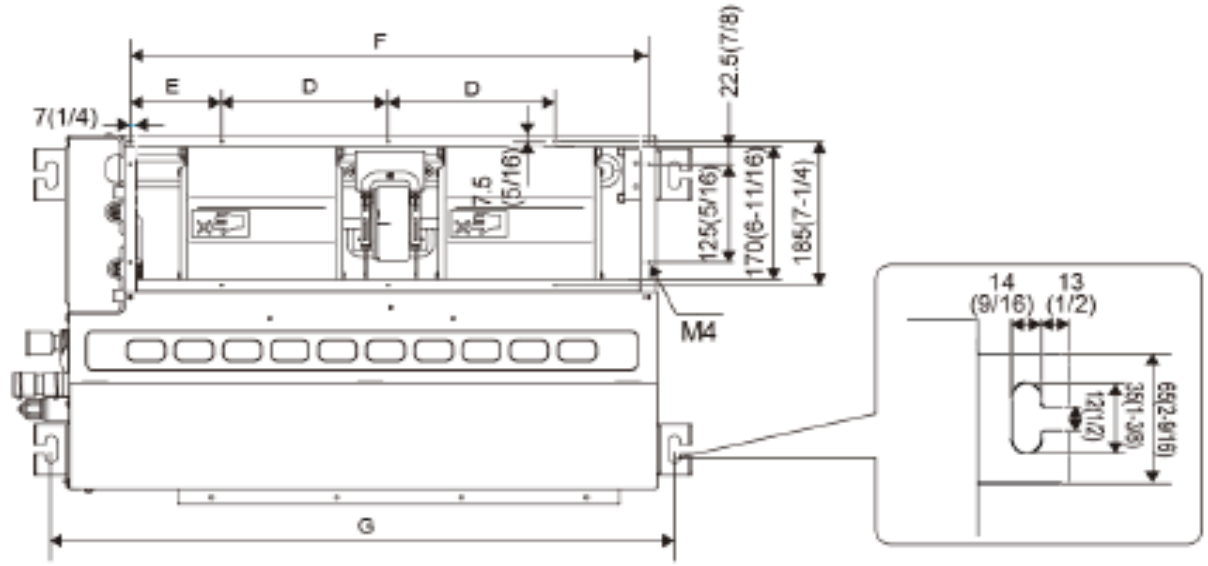
Size of return air inlet (back return air mode):



Dimension of pipe and water pipe:



Size of return air inlet (bottom return air mode), and the distance between the lugs:



Capacity (kBtu/h)	A	B	C	D	E	F	G	H	I
kBtu/h ≤ 7	550(21-5/8)	380(14-15/16)	455(17-15/16)	250(9-13/16)	109.5(4-5/16)	469(18-7/16)	595(23-7/16)	3/4-16 UNF	7/16-20 UNF
7 < kBtu/h ≤ 12	700(27-9/16)	530(20-7/8)	605(23-13/16)	200(8-7/8)	109.5(4-5/16)	619(24-3/8)	745(29-5/16)	3/4-16 UNF	7/16-20 UNF
12 < kBtu/h ≤ 18	900(35-7/16)	730(28-3/4)	805(31-11/16)	200(8-7/8)	109.5(4-5/16)	819(32-1/4)	945(37-3/16)	3/4-16 UNF	7/16-20 UNF
18 < kBtu/h ≤ 24	1 100(43-5/16)	930(36-5/8)	1 005(39-9/16)	200(8-7/8)	109.5(4-5/16)	1 019(40-1/8)	1 145(45-1/16)	7/8-14 UNF	5/8-18 UNF
24 < kBtu/h ≤ 36	1 600(63)	1 400(55-1/8)	1 505(59-1/4)	200(8-7/8)	159.5(6-1/4)	1 519(59-13/16)	1 645(64-3/4)	7/8-14 UNF	5/8-18 UNF

Fig. 2 —Dimensions - All Sizes

UNIT PLACEMENT

PLACEMENT CONSIDERATION

Unit placement should take account of the following considerations:

Units should not be installed in the following locations:

- A place filled with mineral oil, fumes or mist, like a kitchen.
- A place where there are corrosive gases, such as acid or alkaline gases.
- A place exposed to combustible gases and using volatile combustible gases such as diluent or gasoline.
- A place where there is equipment emitting electromagnetic radiation.
- A place where there is a high salt content in the air like a coast.
- Do not use the air conditioner in an environment where an explosion may occur.
- Places like in vehicles or cabin rooms.
- Factories with major voltage fluctuations in the power supplies.
- Other special environmental conditions.

Units should be installed in positions where:

- Ensure that the airflow in and out of the IDU is reasonably organized to form an air circulation in the room.
- Ensure IDU maintenance space.
- The nearer the drainage pipe and copper pipe are to the ODU, the lower the pipe cost is.
- Prevent the air conditioner from blowing directly to the human body.
- The closer the wiring to the power cabinet, the lower the wiring cost is.
- Keep the air-conditioning return air away from the setting sun of the room.
- Be careful not to interfere with the light tank, fire pipe, gas pipe and other facilities.
- The IDU should not be lifted in the places like load-bearing beam and columns that affect the structural safety of the house.
- Wired controller and IDU should be in same installation space; otherwise, the sampling point setting of wired controller will need to be changed.

SPACE REQUIREMENTS

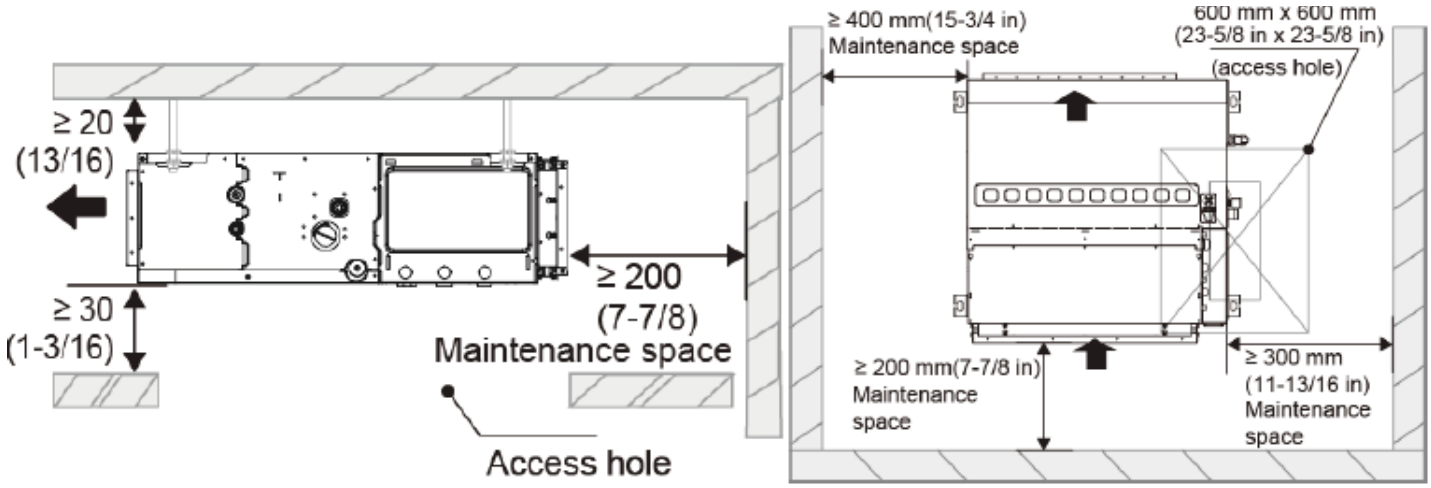


Fig. 3 —Low Static Ducted Space Requirements (unit: in.)

NOTE: The centerline of the maintenance hole should be in the same position as the centerline of the indoor unit.

PIPING DIAGRAM

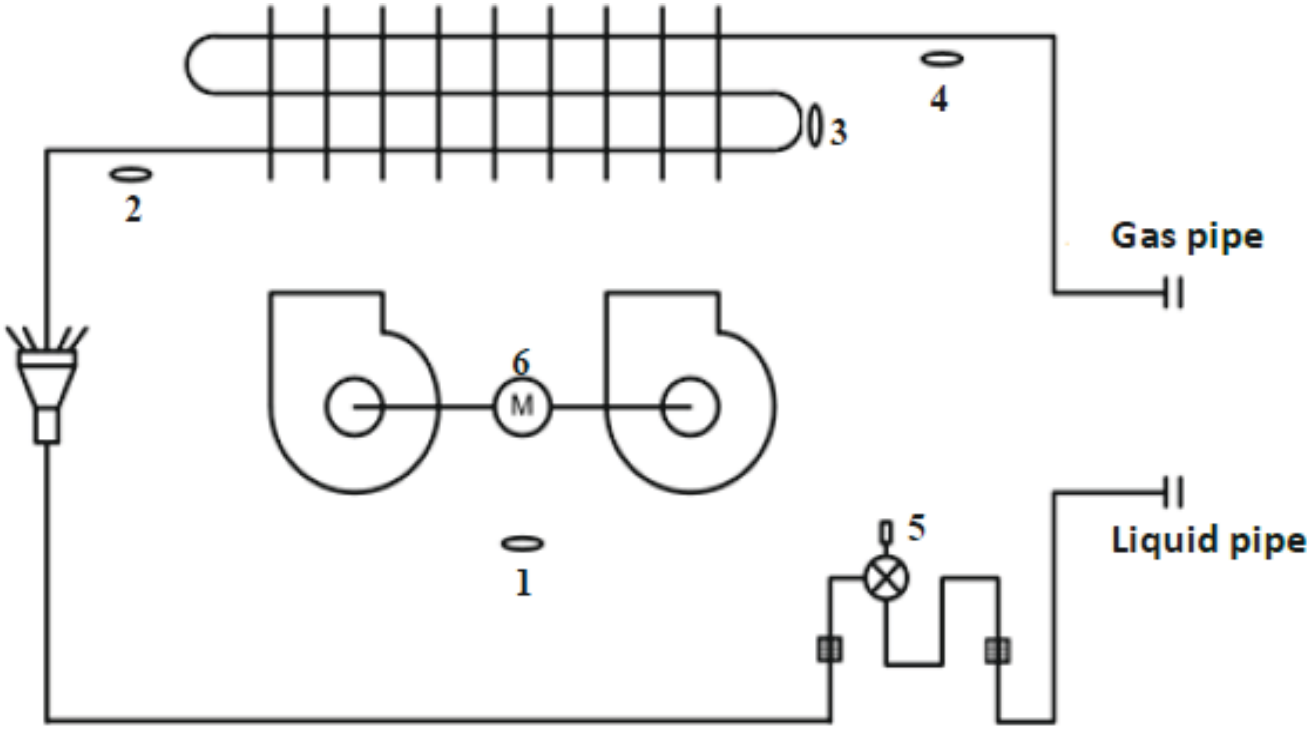


Fig. 4 —Low Static Pressure Duct Piping Diagram

Table 4 — Legend

Legend	Code	Description
1	T1	Inlet Air Temp. Sensor
2	T2A	Liquid Pipe Temp. Sensor
3	T2	Middle Pipe Temp. Sensor
4	T2B	Gas Pipe Temp. Sensor
5	EEV	Electronic Expansion Valve
6	FAN	DC Fan Motor

WIRING DIAGRAM

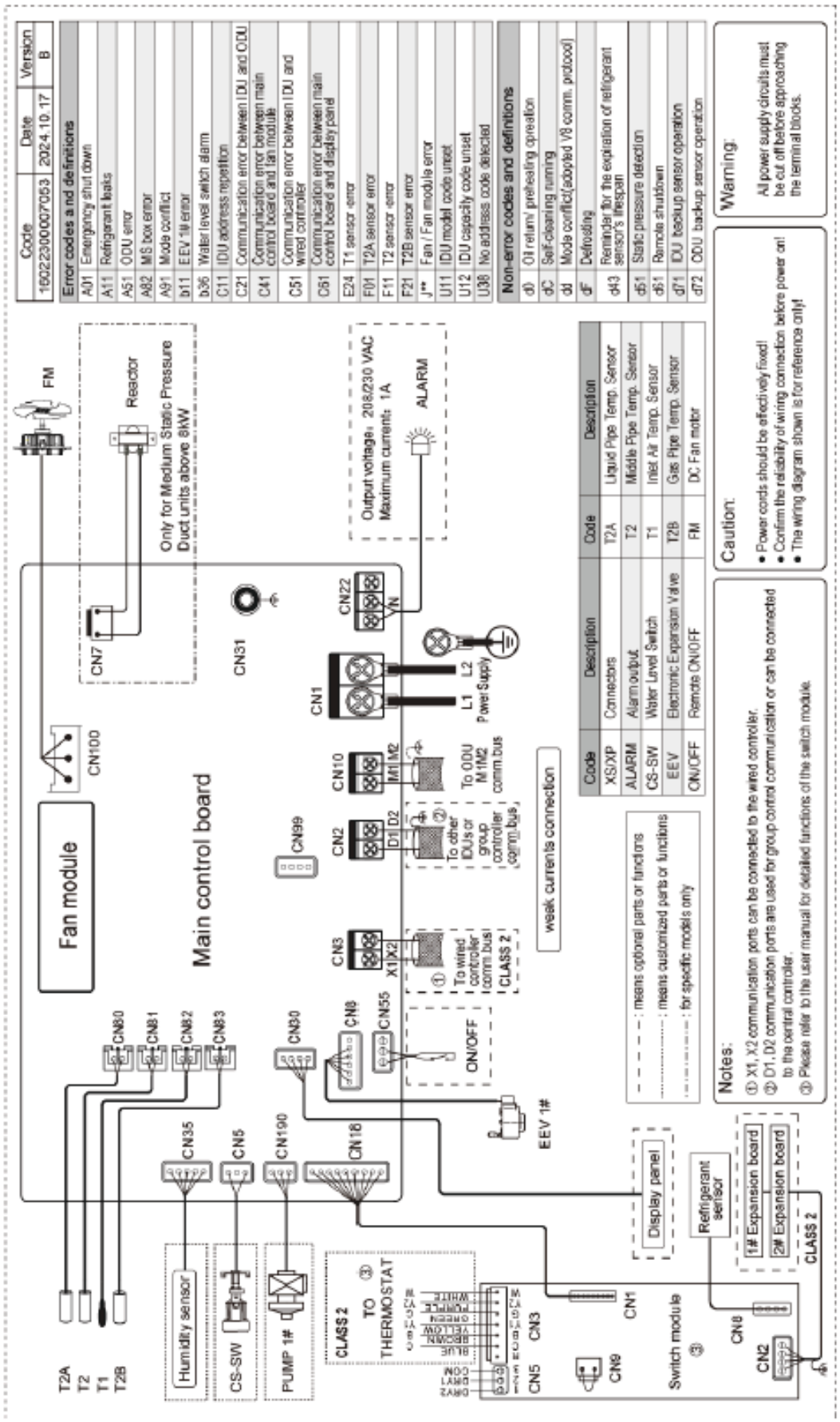


Fig. 5 —Wiring Diagram

⚠ CAUTION

All installation, servicing and maintenance must be carried out by competent and suitably qualified, certified and accredited professionals and in accordance with all applicable legislation.

Units should be grounded in accordance with all applicable legislation. Metal and other conductive components should be insulated in accordance with all applicable legislation.

Power supply wiring should be securely fastened at the power supply terminals – loose power supply wiring would represent a fire risk.

After installation, servicing or maintenance, the electric control box cover should be closed. Failing to close the electric control box cover risks fire or electric shock.

The dotted lines indicate the field wiring or optional function.

D1D2 communication ports are used for group control communication. When connecting the group controller, the D1D2 port of the indoor units that are to be group controlled must be connected in daisy chain, and the group controller must be connected to the X1X2 port of one of the indoor units in the group control, and set to group control mode. In addition, D1D2 communication ports can also be connected to the central controller.

CAPACITY TABLES

Table 5 — Cooling Capacity Table

Model	Indoor air temperature (°C WB/DB)													
	14/20		16/23		18/26		19/27		20/28		22/30		24/32	
	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
45VML05	4.8	4.8	5.1	4.8	5.1	4.4	5.0	4.4	5.5	4.4	5.5	4.1	5.5	3.8
45VML07	6.5	6.1	6.8	6.1	7.2	6.1	7.0	5.8	7.5	6.1	7.5	5.5	7.8	5.5
45VML09	7.8	7.5	8.5	7.8	8.9	7.8	9.0	7.5	9.2	7.2	9.2	6.8	9.6	6.5
45VML12	10.6	10.2	11.3	10.2	11.9	10.2	12.0	9.9	12.3	9.6	12.6	9.2	13.0	8.9
45VML15	13.3	12.6	14.3	13.0	15.0	13.0	15.0	12.3	15.4	11.9	15.7	11.6	16.0	10.9
45VML18	16.0	15.4	17.1	15.4	18.1	15.4	18.0	14.7	18.4	14.7	18.8	13.6	19.4	13.3
45VML24	21.2	20.5	22.5	20.5	23.5	20.1	24.0	19.4	24.2	19.1	24.9	18.1	25.6	17.4
45VML30	26.6	25.2	28.3	25.2	29.7	25.2	30.0	24.2	30.4	23.5	31.4	22.9	32.1	21.8
45VML36	32.1	30.7	34.1	30.7	35.8	30.4	36.0	29.3	36.5	28.7	37.5	27.3	38.6	26.3

ABBREVIATIONS:
TC: Total capacity (kBtu/h)
SC: Sensible capacity (kBtu/h)
NOTE: Shaded cells indicate rating condition.

Table 6 — Heating Capacity Table

Model	Indoor air temperature (°C DB)					
	16	18	20	21	22	24
	SHC	SHC	SHC	SHC	SHC	SHC
45VML05	6.6	6.6	6.0	6.0	5.8	5.4
45VML07	8.5	8.4	8.0	7.6	7.4	6.9
45VML09	10.5	10.4	10.0	9.7	9.2	8.7
45VML12	14.3	14.2	13.5	13.1	12.8	12.0
45VML15	18.1	17.9	17.0	16.5	16.0	14.9
45VML18	22.4	22.2	21.0	20.4	19.9	18.5
45VML24	28.6	28.3	27.0	26.1	25.3	23.5
45VML30	36.2	35.8	34.0	33.1	32.1	29.9
45VML36	42.3	41.9	40.0	38.7	37.5	34.7

ABBREVIATIONS:
SHC: Sensible Heat Capacity (kBtu/h)
NOTE: Shaded cells indicate rating condition.

ELECTRICAL CHARACTERISTICS

Table 7 — Electrical Characteristics

Model name	Power supply				Indoor Fan Motor
	Hz	Volts	MCA	MFA	Rated motor output (W)
45VML05	60	208/230	1.13	15	20
45VML07	60	208/230	1.13	15	20
45VML09	60	208/230	1.19	15	20
45VML12	60	208/230	1.19	15	20
45VML15	60	208/230	1.32	15	30
45VML18	60	208/230	1.32	15	30
45VML24	60	208/230	1.43	15	50
45VML30	60	208/230	1.94	15	60
45VML36	60	208/230	1.94	15	60

SOUND LEVELS

OVERALL

Table 8 — Sound Pressure Levels

Model name	Sound pressure levels dB						
	SSH	SH	H	M	L	SL	SSL
45VML05	32	30	28.5	27.5	26.5	25.5	25
45VML07	32	30	28.5	27.5	26.5	25.5	25
45VML09	33	31	29	28	26	24	23
45VML12	37.5	35	32	29	26	24	22
45VML15	36	32.5	30.5	28	25.5	23	21.5
45VML18	39	36	33.5	31.5	30	28	26
45VML24	39	36	34	31.5	29	25	22
45VML30	40	38	36.5	35.5	33.5	31.5	29
45VML36	46.5	44	41.5	39.5	36.5	33.5	30.5

NOTE: The sound pressure levels are measured 59-1/16in. (1.5m) below the unit in a semi-anechoic chamber. During in-situ operation, sound pressure levels may be higher as a result of ambient noise.

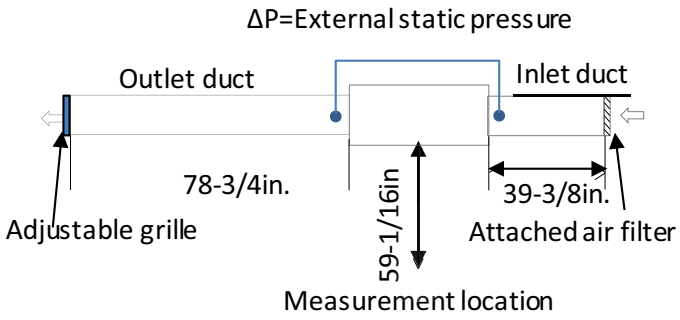


Fig. 6 —Sound Pressure Level Measurement

Connected to a top-discharge outdoor unit and measured in anechoic room. Adjusting the outlet grille to make the ΔP is equal to the rated static pressure, the data was recorded at 1.5m below the unit.

OCTAVE BAND LEVELS

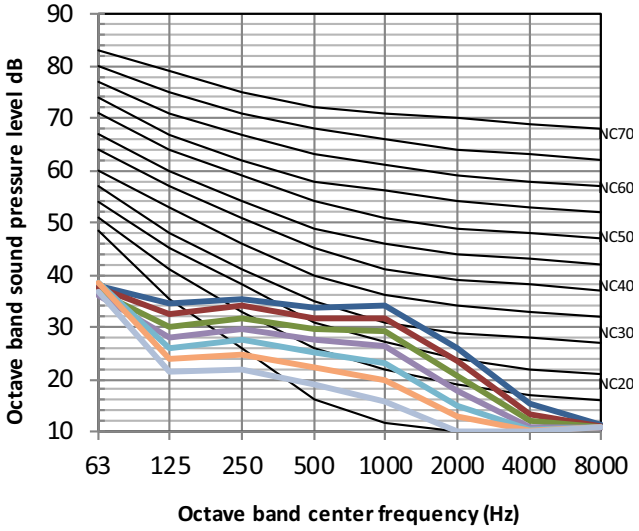


Fig. 7 —45VML05

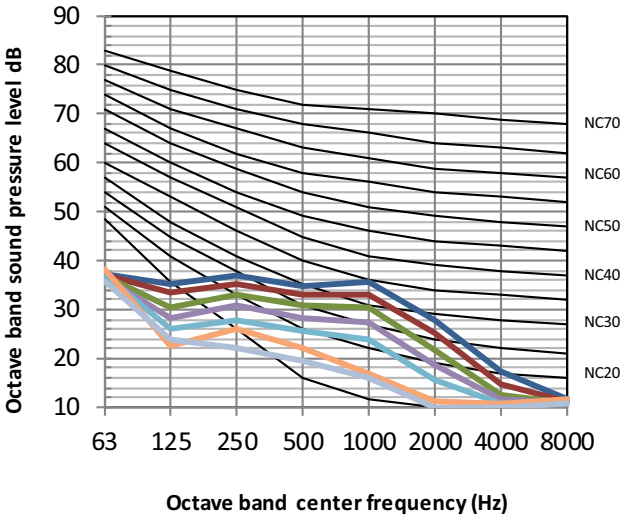


Fig. 10 —45VML07

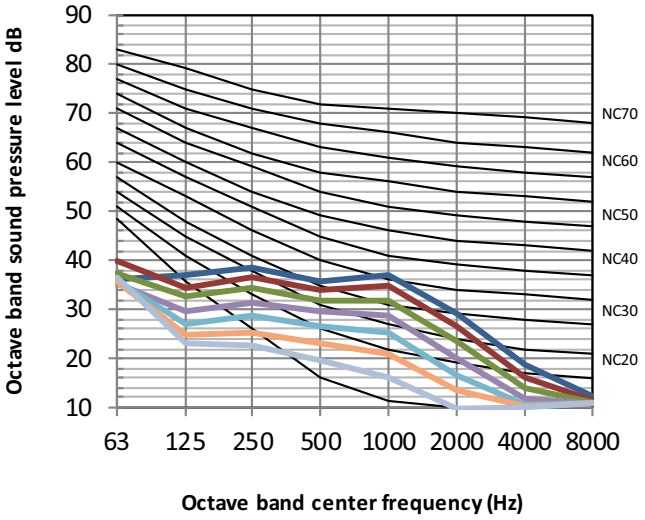


Fig. 8 —445VML09

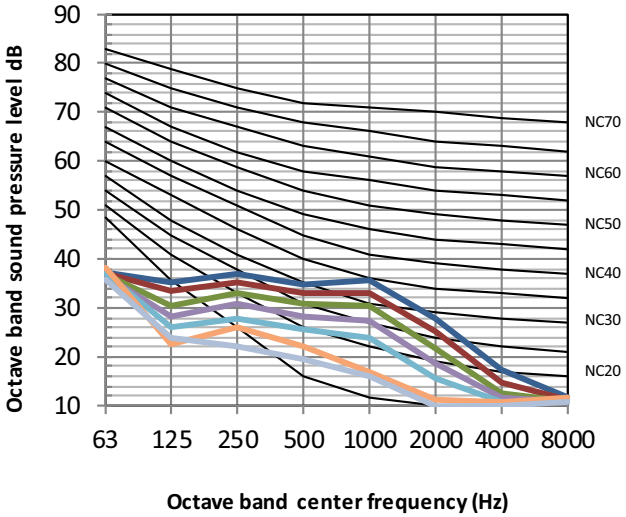


Fig. 11 —45VML12

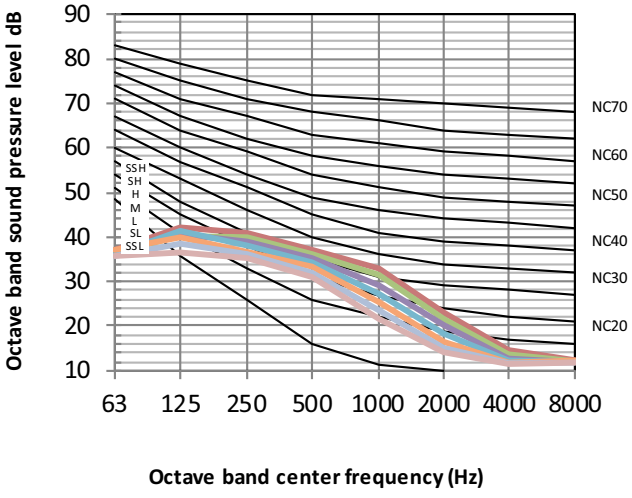


Fig. 9 —45VML15

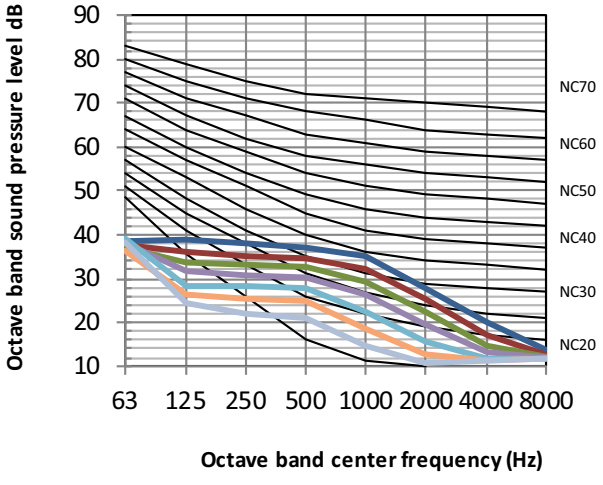


Fig. 12 —45VML18

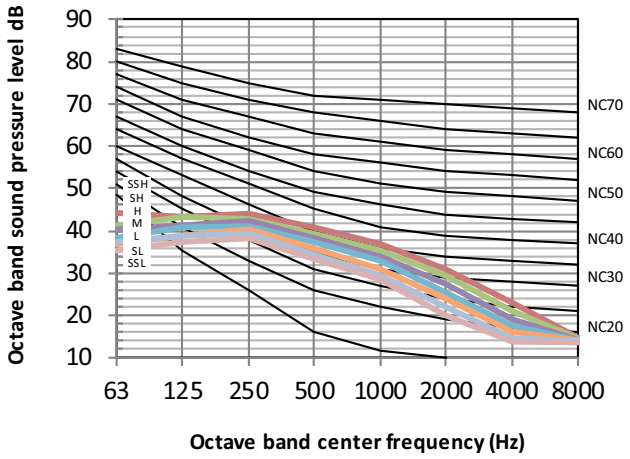


Fig. 13 —45VML24

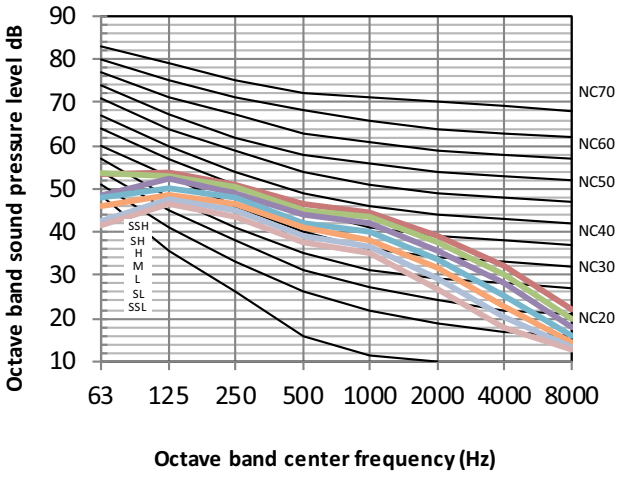


Fig. 14 —45VML36

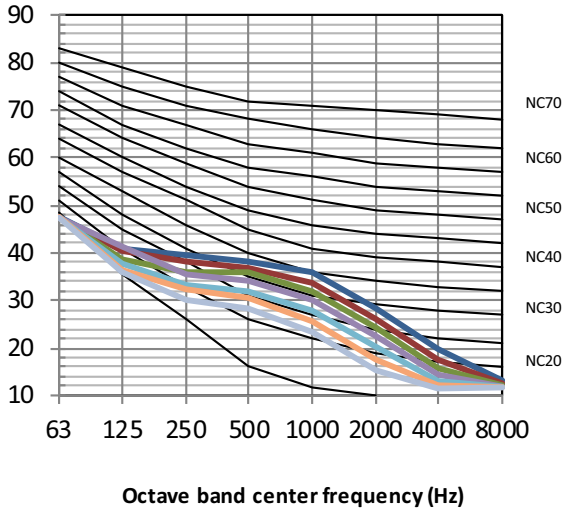


Fig. 15 —45VML30

FAN PERFROMANCE

How to switch between Constant Airflow mode and Constant Speed mode

- Parameters can be set in the power-on or power-off state.
- Hold "☰" and " >" for 3 seconds to enter the parameter setting interface.
- After entering the parameter setting interface, Press " ∨" and " ∧" to switch the parameter. Set parameters according to the Table of Parameter Settings. Press " ○" to enter the parameter setting interface.

Then press "<" and " > " to change parameter value and press " ○ " tosave changes.

- Press the " back " button to return to the previous page until exiting the parameter setting or exiting the parameter setting after 60 s without any operation.
- When it is in the parameter settings page, the wired controller does not respond to any remote control signal.

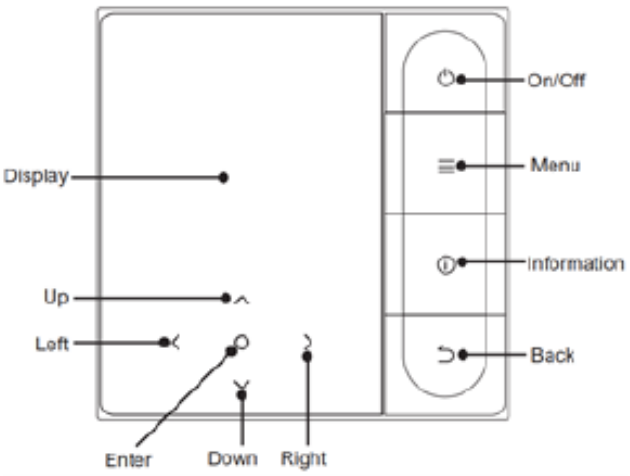


Table 9 — Low Static Pressure Duct Mode Setting

IDU set item	Parameter name	Parameter range	Default value	Remarks
Fan speed setting	Air flow at fan speed 7	00/01	01	00: constant speed; 01: constant air flow

Constant Airflow Mode

Fan Performance Diagrams

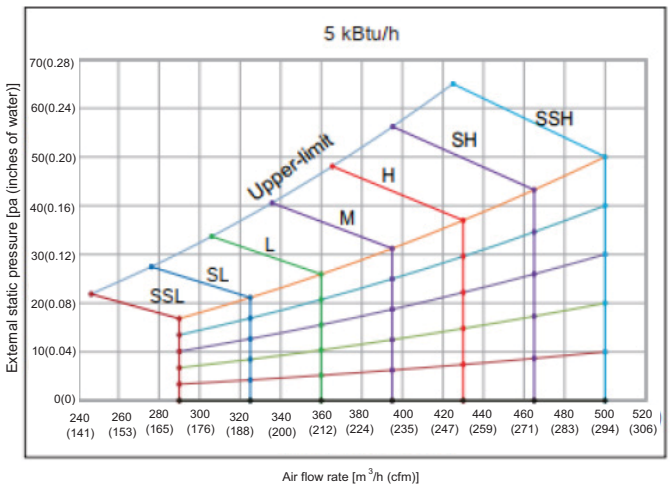


Fig. 16 —45VML05

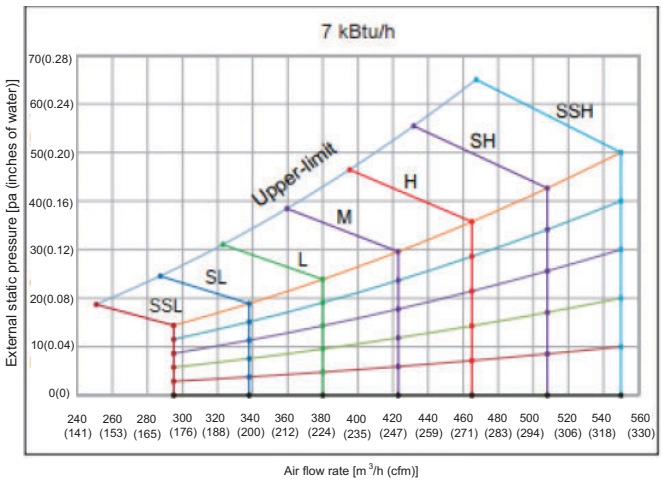


Fig. 17 —45VML07

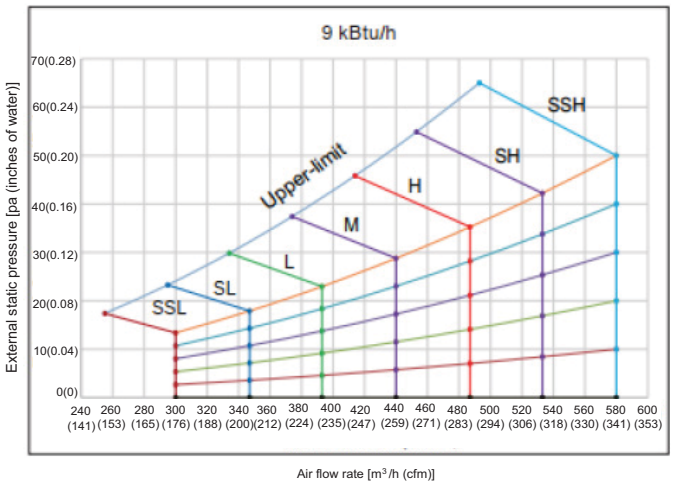


Fig. 18 —45VML09

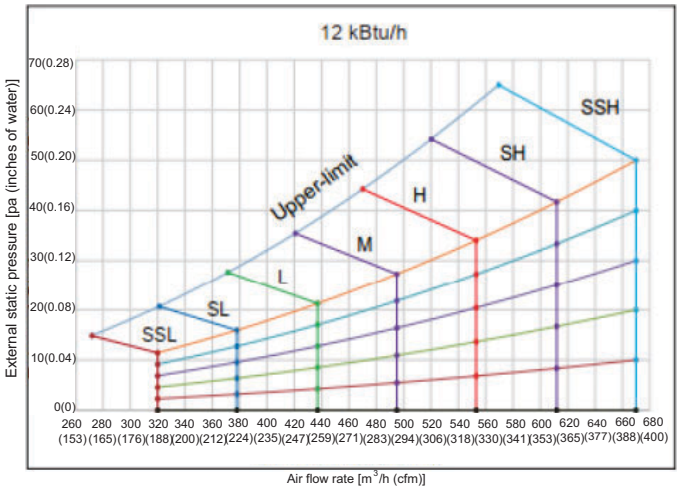


Fig. 21 —45VML12

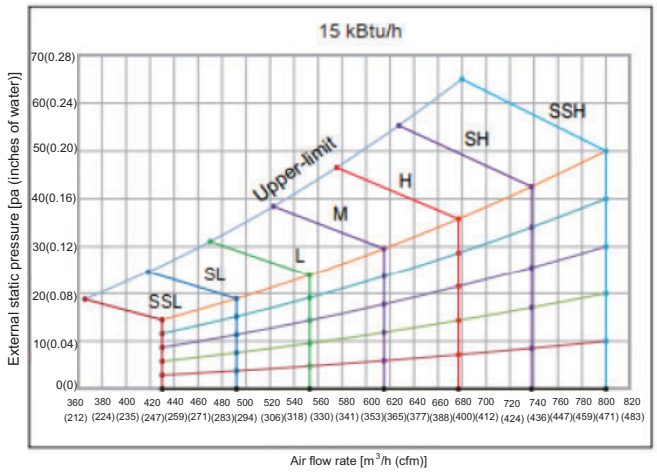


Fig. 19 —45VML15

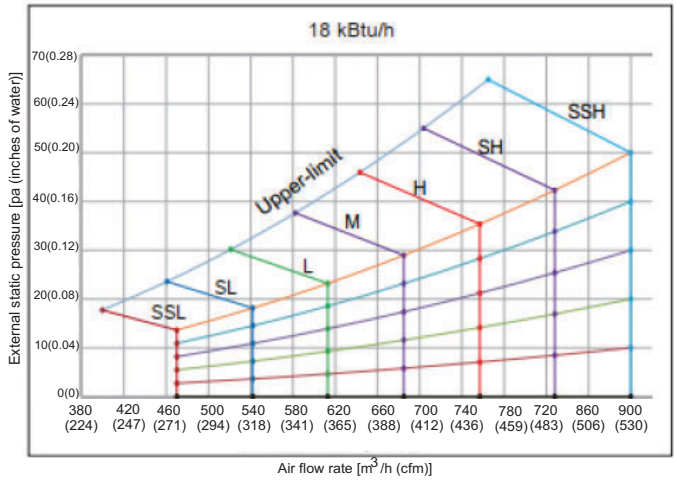


Fig. 22 —45VML18

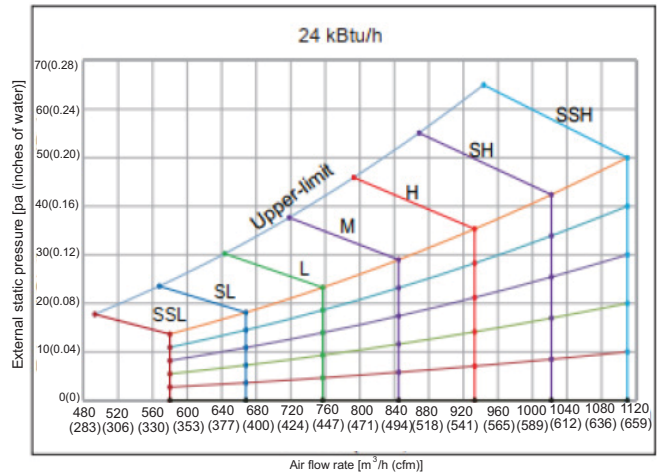


Fig. 20 —45VML24

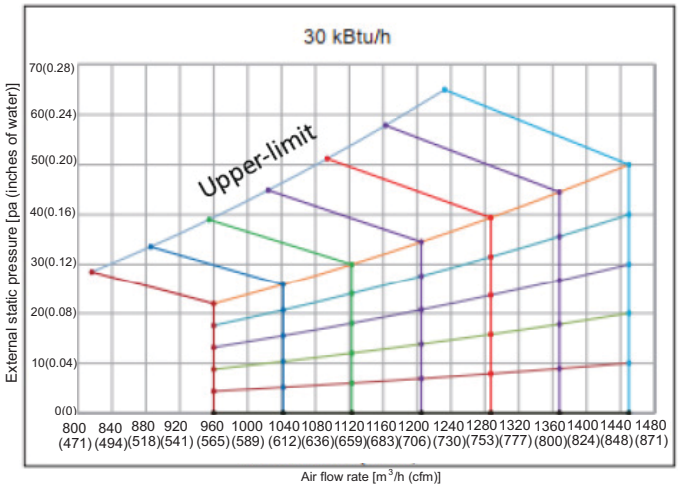


Fig. 23 —45VML30

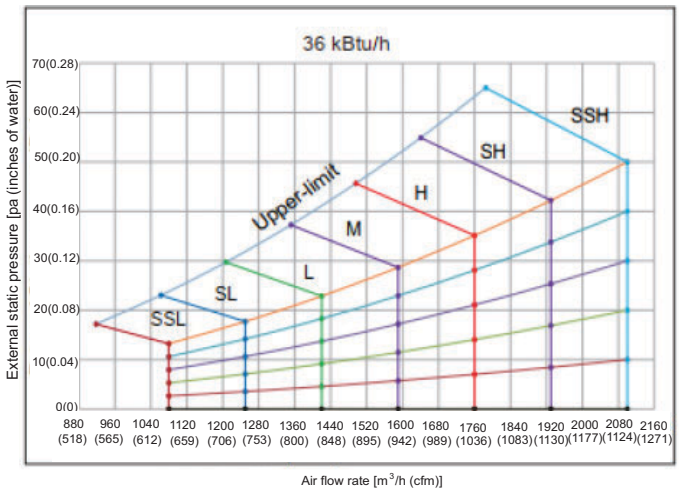


Fig. 24 —45VML36

How to Read the Diagram

The vertical axis is the External Static Pressure (Pa) while the horizontal axis represents the Air Flow (m^3/h). The characteristic curve for the “SSH”,“SH”, “H”, “M”, “L”,”SL” and “SSL” fan speed control.

For MIH24T3MN10, in “H” windshield, when the external static pressure is less than 63.7 Pa, the air flow keeps 1249 m^3/h, but when the external static pressure is greater than 63.7 Pa, the air flow begins to decline, and the allowable maximum external static pressure is 74 Pa.

Constant Speed mode

Table 10 — External Static Pressure Setting

IDU set item	Parameter name	Parameter range	Default value	Remarks
On-site settings	IDU static pressure	00/01-19/FF	FF	IDU static pressure is set based on the parameter value.

Level	00	01	02	03	04-19
Static pressure Pa((in.wg)	10(0.04)	20(0.08)	30(0.12)	40(0.16)	50(0.2)

Note: The above is only an example of WDC3-120T2 wired controller. If you choose other controllers, please refer to their manuals for setting.

Fan Performance Diagrams

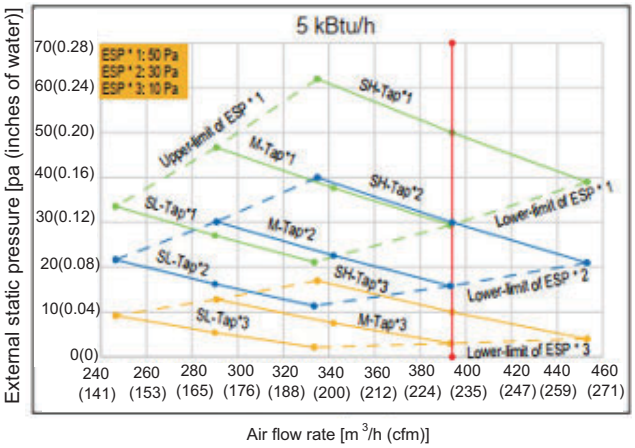


Fig. 25 —45VML05

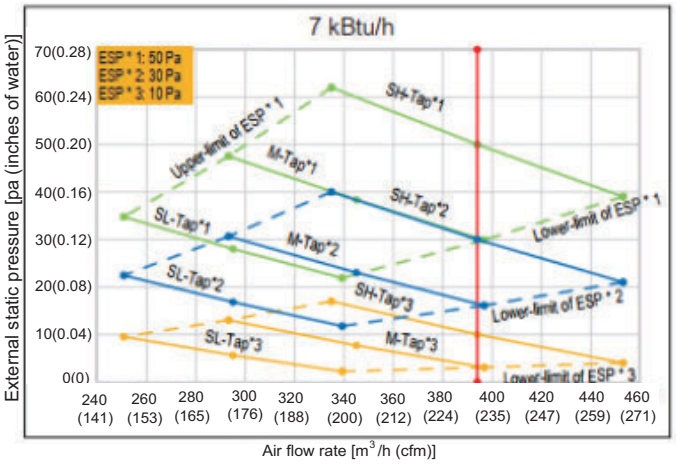


Fig. 27 —45VML07

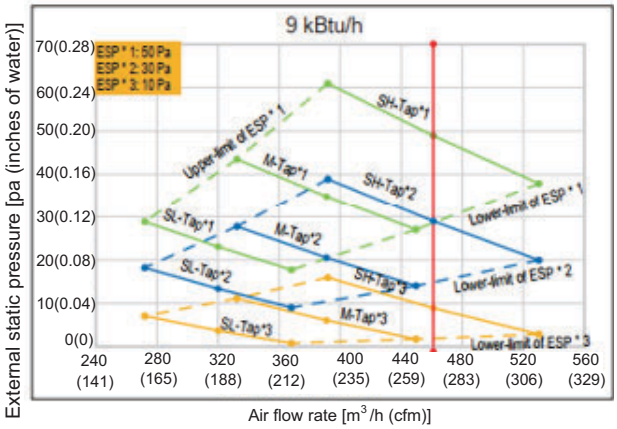


Fig. 26 —45VML09

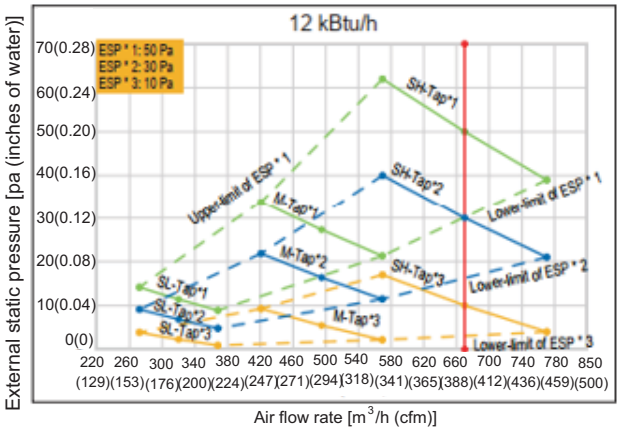


Fig. 28 —45VML12

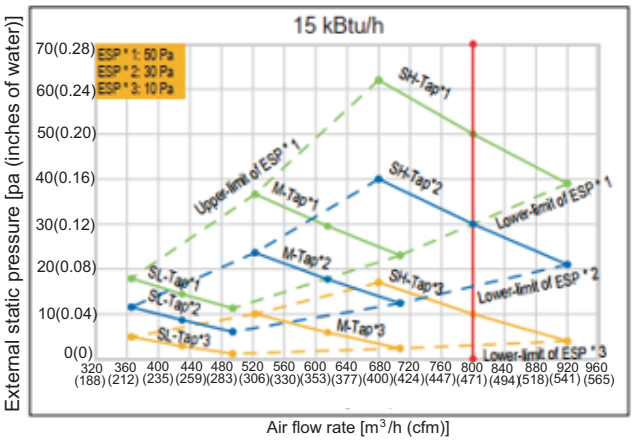


Fig. 29 —45VML15

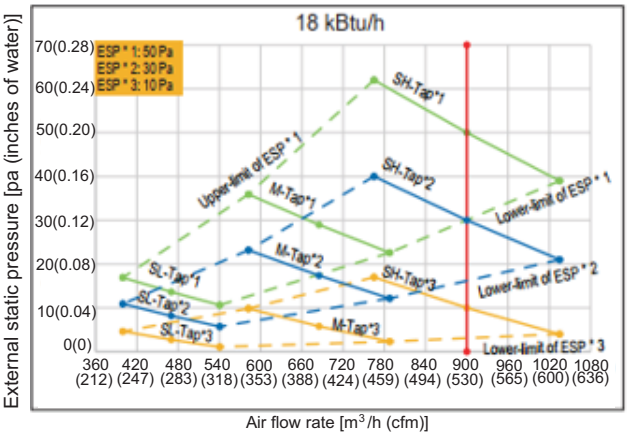


Fig. 31 —45VML18

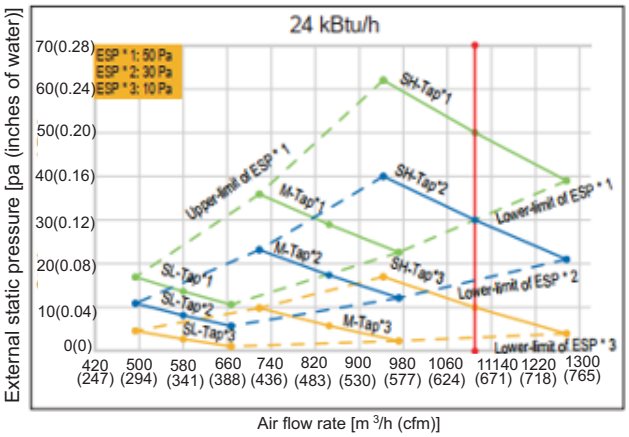


Fig. 30 —45VML24

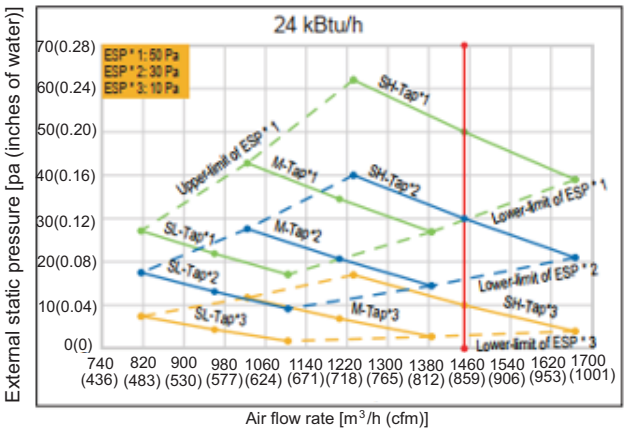


Fig. 32 —45VML30

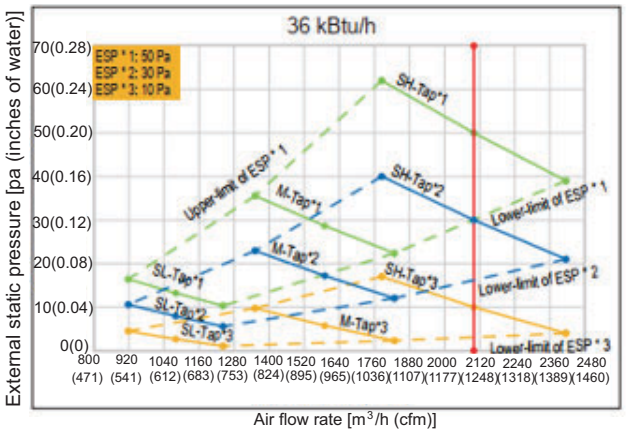


Fig. 33 —45VML36

How to Read the Diagram

The vertical axis is the External Static Pressure (Pa) while the horizontal axis represents the Air Flow (m^3/h). The characteristic curve for the "SSH", "M" and "SSL" fan speed control.

The Air Flow decreases with the increase of the external static pressure. For MIH24T3MN10, in "SSH" windshield and "50Pa" setting static pressure, when the externa static pressure is 50Pa, the air flow is 1400 m^3/h, and the allowable externa static pressure range is 39 to 62.

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