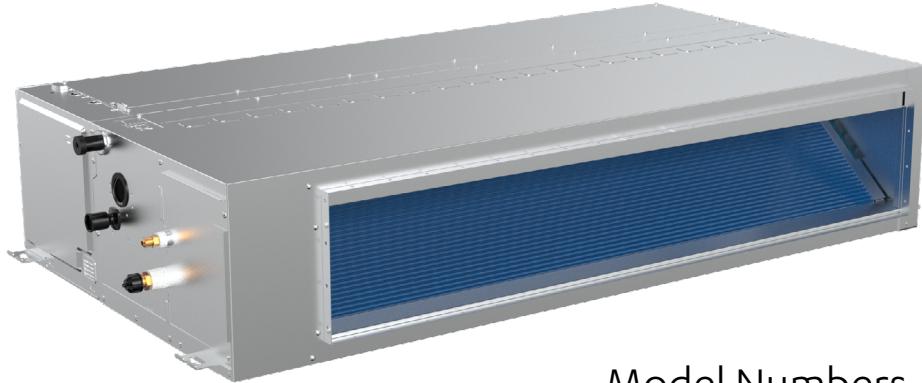


ECOFLEX MINI VRF HIGH STATIC INDOOR UNIT TECHNICAL SELECTION DATA



Model Numbers

MHD-056CS	MHD-112CS
MHD-071CS	MHD-125CS
MHD-080CS	MHD-140CS
MHD-090CS	MHD-160CS

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TECHNICAL SELECTION DATA

ECOFLEX - Mini VRF

01. Specification

Model		MHD-056CS	MHD-071CS	MHD-080CS	MHD-090CS	
Power supply		1-phase, 230V, 50Hz				
Cooling ¹	Capacity	kW	5.6	7.1	8.0	9.0
		kBtu/h	19.1	24.2	27.3	30.7
	Power Input	W	159	159	159	196
Heating ²	Capacity	kW	6.3	8	9	10
		kBtu/h	21.5	27.3	30.7	34.1
	Power Input	W	159	159	159	196
Fan motor	Type	DC				
	Number	1				
Indoor Coil	Number of rows		3			
	Tube pitch	mm	18×10.72			
	Fin spacing	mm	1.35			
	Fin Type		Hydrophilic aluminum			
	Tube OD and type	mm	Ø5 Inner-groove			
	Dimensions (L×H×W)	mm	850×360×32.16			
	Number of circuits		10			
Air flow rate ³ (OPa) (Max / Min) ⁷		l/s	378 / 246	378 / 246	378 / 246	417 / 271
External static pressure ⁸		Pa	80 (0-250)			
Sound pressure level ⁴ (OPa) (Max / Min) ⁷		dB(A)	39 / 30	39 / 30	39 / 30	40 / 31
Sound power level		dB(A)	59 / 47	59 / 47	59 / 47	63 / 50
Unit	Net dimensions ⁶ (W×H×D)	mm	1050×299×750			
	Packed dimensions (W×H×D)	mm	1215×359×890			
	Net/Gross weight	kg	35/38.5			
Refrigerant type		R-32				
Design pressure (H/L)		MPa	4.4/2.6			
Pipe connections	Liquid/Gas pipe		Ø6.35mm / Ø12.7mm (1/4" / 1/2")	Ø9.52mm / Ø15.9mm (3/8" / 5/8")		
	Drain pipe	mm	OD Ø25			

Notes:

- Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 5m with zero level difference.
- Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 5m with zero level difference.
- Air flow rates are from the highest speed to the lowest speed, total 7 rates for each model.
- Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 1.4m below the unit in a Sem-anechoic chamber.
- Sound power level is from highest level to lowest level, total 7 levels for each model.
- Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.
- Refer to the section Sound Levels for more details.
- 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.)

TECHNICAL SELECTION DATA

ECOFLEX - Mini VRF

Model		MHD-112CS	MHD-125CS	MHD-140CS	MHD-160CS	
Power supply		1-phase, 230V, 50Hz				
Cooling ¹	Capacity	kW	11.2	12.5	14	16
		kBtu/h	38.2	42.7	47.8	54.6
	Power Input	W	248	252	284	339
Heating ²	Capacity	kW	12.5	14	16	18
		kBtu/h	42.7	47.8	54.6	61.4
	Power Input	W	248	252	284	339
Fan motor	Type	DC				
	Number	1				
Indoor Coil	Number of rows	3	2	3	2	
	Tube pitch	mm	18×10.72			
	Fin spacing	mm	1.35			
	Fin Type	Hydrophilic aluminum				
	Tube OD and type	mm	Ø5 Inner-groove			
	Dimensions (L×H×W)	mm	1200×360×21.44			
	Number of circuits	10				
Air flow rate ³ (OPa) (Max / Min) ⁷	l/s	594 / 386	597 / 388	667 / 433	722 / 469	
External static pressure ⁸	Pa	80 (0-250)	100 (0-250)			
Sound pressure level ⁴ (OPa) (Max / Min) ⁷	dB(A)	41 / 32	41 / 33	43 / 34	44 / 35	
Sound power level	dB(A)	63 / 52	66 / 54	67 / 55	68 / 57	
Unit	Net dimensions ⁶ (W×H×D)	mm	1400×299×750			
	Packed dimensions (W×H×D)	mm	1565×359×890			
	Net/Gross weight	kg	44.5/48.5	46.5/50.5		
Refrigerant type	R-32					
Design pressure (H/L)	MPa	4.4/2.6				
Pipe connections	Liquid/Gas pipe	Ø9.52mm / Ø15.9mm (3/8" / 5/8")				
	Drain pipe	mm	OD Ø25			

Notes:

- Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 5m with zero level difference.
- Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 5m with zero level difference.
- Air flow rates are from the highest speed to the lowest speed, total 7 rates for each model.
- Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 1.4m below the unit in a Sem-anechoic chamber.
- Sound power level is from highest level to lowest level, total 7 levels for each model.
- Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.
- Refer to the section Sound Levels for more details.
- 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.)

02. Dimensions

02.01. Unit Dimensions

Figure 2.1: High Static dimensions (unit: mm)

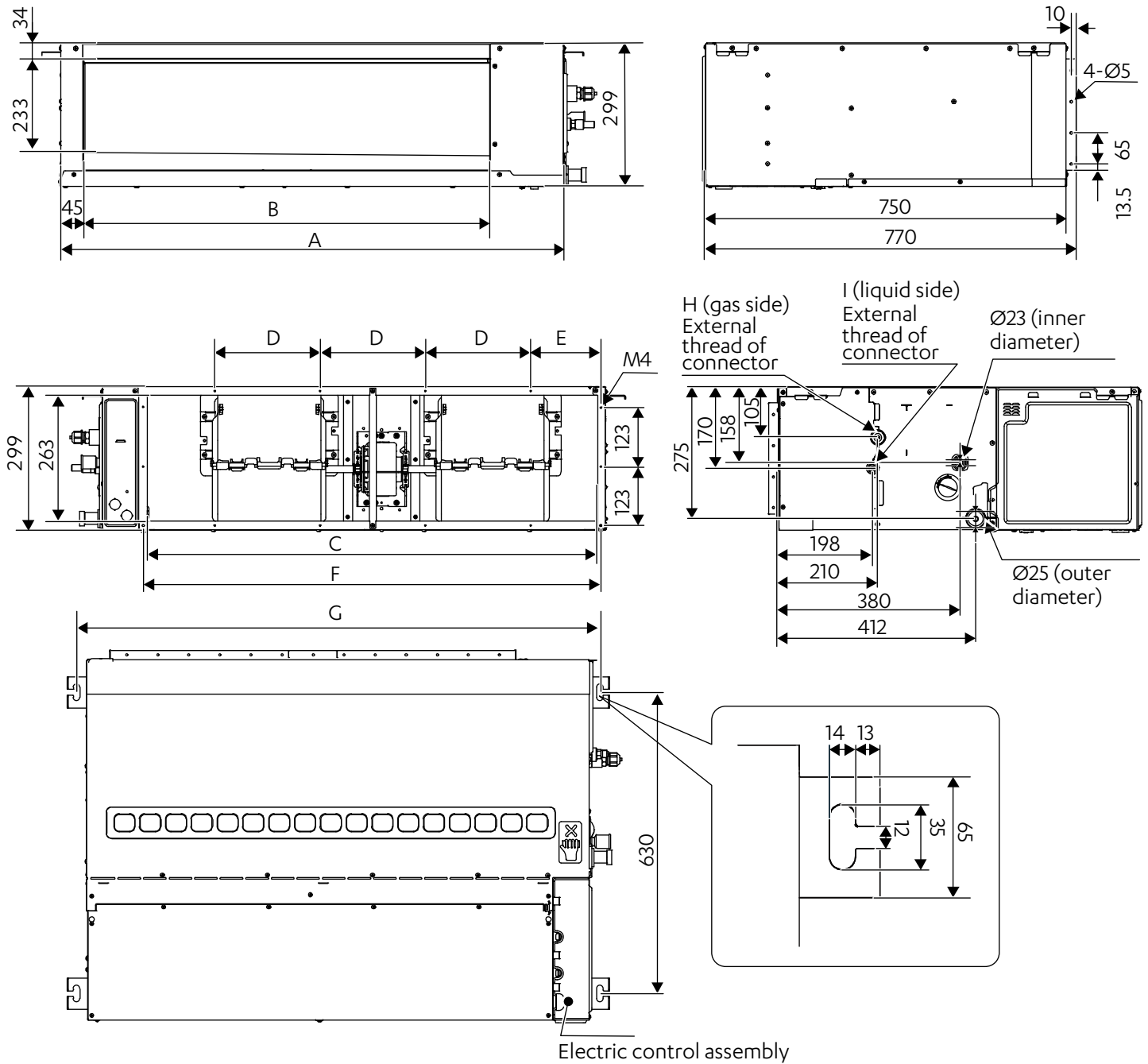


Table 2.1: Letter-Size Correspondence Table: (unit: mm)

Capacity (kW)	A	B	C	D	E	F	G	H	I
kW≤5.6	1050	850	940	220	146	956	1095	3/4-16 UNF	7/16-20 UNF
5.6<kW≤9.0	1050	850	940	220	146	956	1095	7/8-14 UNF	5/8-18 UNF
9.0<kW≤16.0	1400	1200	1290	220	213	1306	1445		

03. Unit Placement

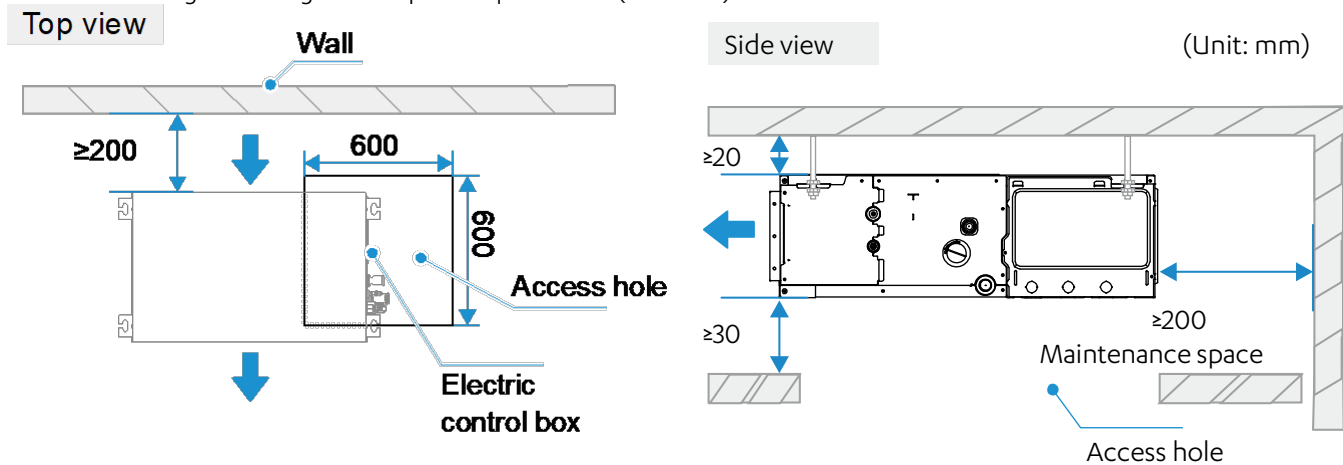
03.01. Placement Considerations

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 e.g. coastal environment.
 - 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.
 - The wired controller and the IDU should be in the same installation space; otherwise, the sampling point setting of the wired controller need to be changed.

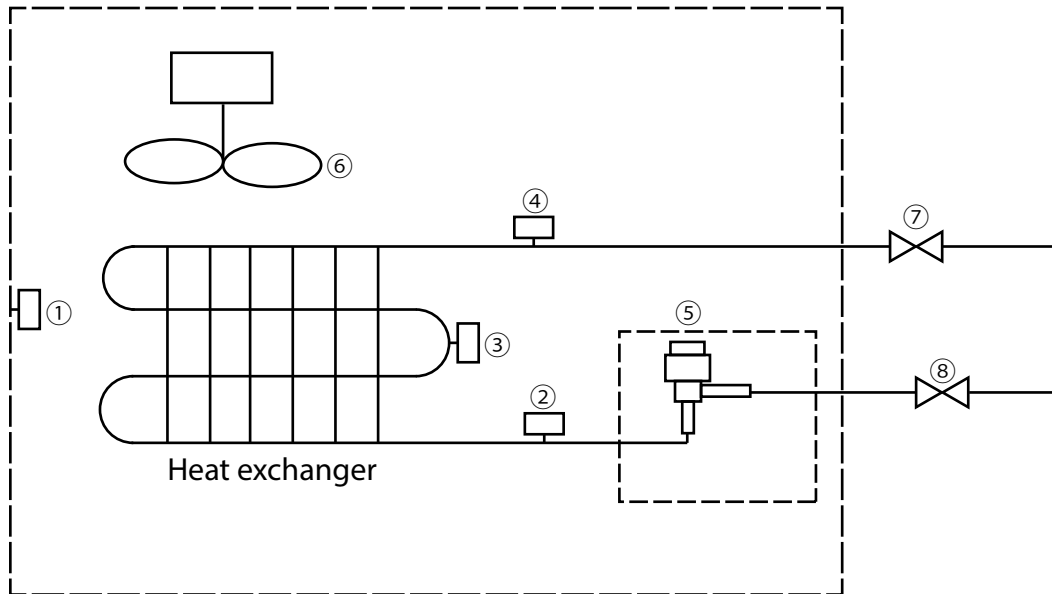
03.02. Space Requirements

Figure 3.1: High Static space requirements (unit: mm)



04. Piping Diagram

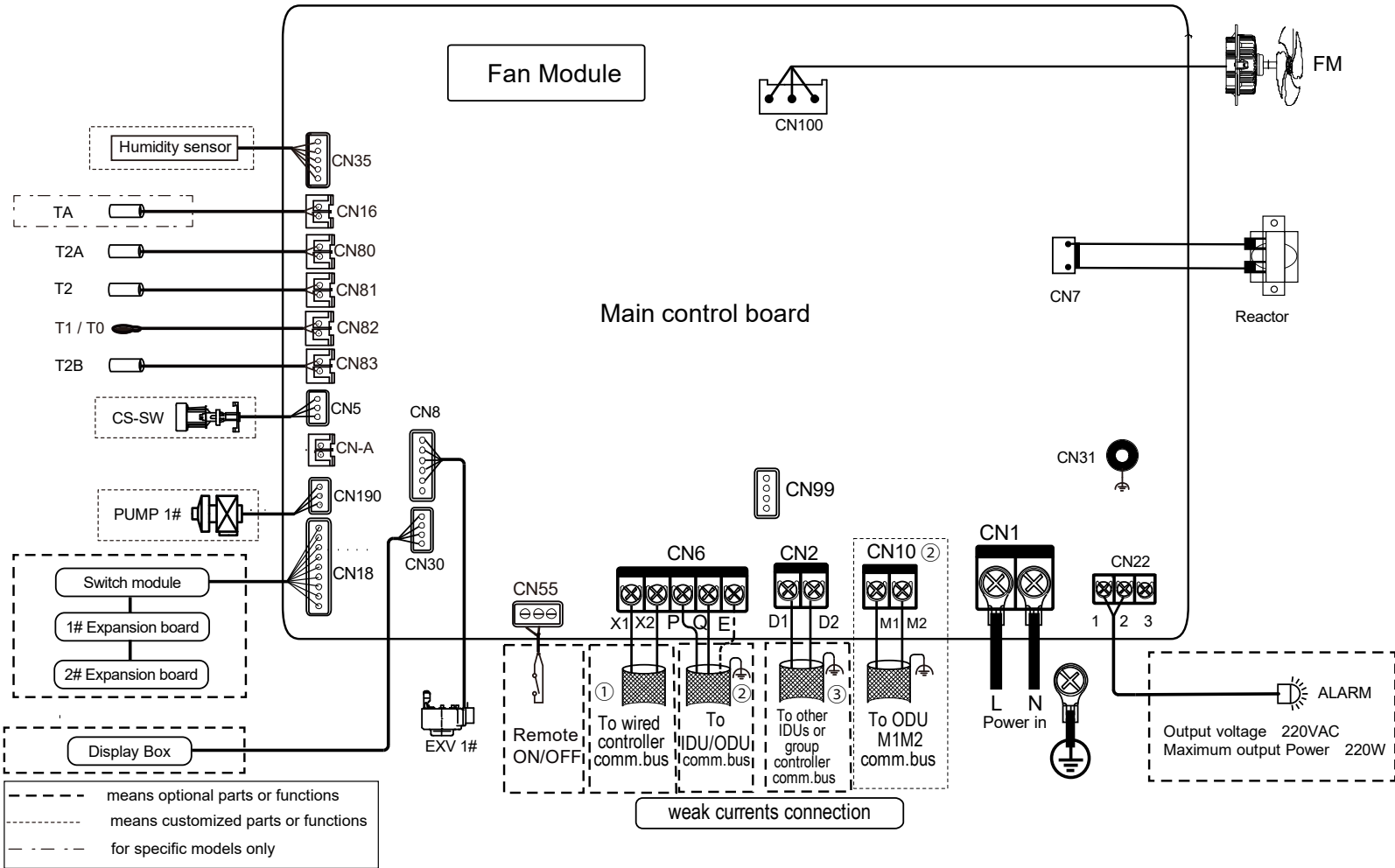
Figure 4.1: High Static piping diagram



Legend		
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	EXV	Electronic expansion valve
⑥	FM	Fan motor
⑦	-	Gas side
⑧	-	Liquid side

05. Wiring Diagram

Figure 5.1: High Static wiring diagram



Installation Notes

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.
- PQ and M1M2 communication ports both are used for indoor and outdoor communication, and only one of them can be used at a time. Meanwhile, be sure to connect the same communication ports (PQ to PQ; M1M2 to M1M2) in case of damage of the main control board.
- 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 a 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.

06. Capacity Tables

06.01. Cooling Capacity Table

Table 6.01: High Static cooling capacity

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
MHD-056CS	5.0	4.8	5.3	4.8	5.6	4.9	5.6	4.7	5.7	4.6	5.8	4.3	6.0	4.1
MHD-071CS	6.3	6.0	6.7	6.1	7.0	6.1	7.1	6.0	7.2	5.8	7.4	5.5	7.6	5.2
MHD-080CS	7.1	6.8	7.6	6.9	7.9	6.9	8.0	6.7	8.1	6.5	8.3	6.1	8.5	5.8
MHD-090CS	8.0	7.5	8.5	7.6	8.9	7.7	9.0	7.5	9.1	7.2	9.4	6.9	9.6	6.6
MHD-112CS	9.9	9.3	10.6	9.5	11.1	9.6	11.2	9.3	11.3	9.0	11.6	8.5	11.9	8.1
MHD-125CS	11.0	10.1	11.8	10.4	12.4	10.5	12.5	10.2	12.6	9.9	12.9	9.4	13.3	9.0
MHD-140CS	12.4	11.3	13.2	11.6	13.8	11.7	14.0	11.4	14.2	11.1	14.5	10.5	14.9	10.1
MHD-160CS	14.2	13.1	15.1	13.3	15.8	13.5	16.0	13.1	16.2	12.7	16.6	12.1	17.0	11.7

Abbreviations:

TC: Total capacity (kW)

SC: Sensible capacity(kW)

Notes:

Shaded cells indicate rated conditions.

06.02. Heating Capacity Table

Table 6.02: High Static heating capacity

Model	Indoor air temperature (°C DB)					
	16	18	20	21	22	24
	TC	TC	TC	TC	TC	TC
MHD-056CS	6.7	6.6	6.3	6.1	5.9	5.5
MHD-071CS	8.5	8.4	8.0	7.8	7.5	7.0
MHD-080CS	9.5	9.5	9.0	8.7	8.5	7.8
MHD-090CS	10.6	10.5	10.0	9.7	9.4	8.8
MHD-112CS	13.3	13.1	12.5	12.1	11.8	10.9
MHD-125CS	14.8	14.7	14.0	13.6	13.2	12.2
MHD-140CS	17.0	16.8	16.0	15.5	15.0	13.9
MHD-160CS	19.1	18.9	18.0	17.5	16.9	15.7

Abbreviations:

TC: Total capacity (kW)

Notes:

Shaded cells indicate rated conditions.

07. Electrical Characteristics

Table 7.1: High Static electrical characteristics

Model	Power Supply						Indoor Fan Motors	
	Hz	Rated Volts	Min. volts	Max. volts	MCA	MFA	Rated motor output (kW)	FLA
MHD-056CS	50/60	230	217	243	2.33	15	240	1.86
MHD-071CS	50/60	230	217	243	2.33	15	240	1.86
MHD-080CS	50/60	230	217	243	2.33	15	240	1.86
MHD-090CS	50/60	230	217	243	2.46	15	240	1.97
MHD-112CS	50/60	230	217	243	3.34	15	560	2.67
MHD-125CS	50/60	230	217	243	3.38	15	560	2.70
MHD-140CS	50/60	230	217	243	3.75	15	560	3.00
MHD-160CS	50/60	230	217	243	4.13	15	560	3.30

Abbreviations:

MCA: Minimum Circuit Amps

MFA: Maximum Fuse Amps

FLA: Full Load Amps

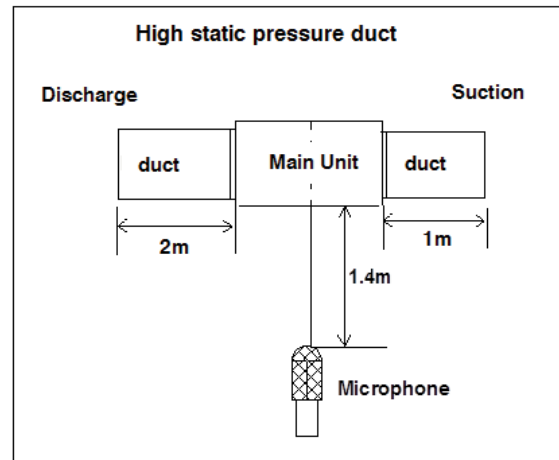
08. Sound Levels

08.01. Overall

Table 8.1.1: High Static sound pressure levels¹

Model	Sound pressure levels dB						
	SSH	SH	H	M	L	SL	SSL
MHD-056CS	39	38	36	35	33	32	30
MHD-071CS	39	38	36	35	33	32	30
MHD-080CS	39	38	36	35	33	32	30
MHD-090CS	40	39	37	36	34	33	31
MHD-112CS	41	40	38	37	35	34	32
MHD-125CS	41	40	39	37	36	35	33
MHD-140CS	43	42	40	39	37	36	34
MHD-160CS	44	43	41	40	38	37	35

Figure 8.1.1: High Static sound pressure level measurement



Notes:

- (1) Sound pressure levels are measured 1.4m below the unit in an anechoic chamber. During in-situ operation, sound pressure levels may be higher as a result of ambient noise.

Table 8.1.2: High Static Air flow rate (l/s).

Model	Air flow rate (l/s)						
	SSH	SH	H	M	L	SL	SSL
MHD-056CS	378	356	334	312	290	268	246
MHD-071CS	378	356	334	312	290	268	246
MHD-080CS	378	356	334	312	290	268	246
MHD-090CS	417	393	368	344	319	295	271
MHD-112CS	594	560	525	491	456	421	386
MHD-125CS	597	563	528	493	458	423	388
MHD-140CS	667	628	589	550	511	472	433
MHD-160CS	722	680	638	596	554	512	469

Table 8.1.2: High Static Sound Power Levels

Model	Sound Power levels dB						
	SSH	SH	H	M	L	SL	SSL
MHD-056CS	59.0	56.0	54.0	53.0	51.0	49.0	47.0
MHD-071CS	59.0	56.0	54.0	53.0	51.0	49.0	47.0
MHD-080CS	59.0	56.0	54.0	53.0	51.0	49.0	47.0
MHD-090CS	63.0	60.0	58.0	56.0	54.0	52.0	50.0
MHD-112CS	63.0	61.0	59.0	57.0	56.0	54.0	52.0
MHD-125CS	66.0	64.0	62.0	60.0	58.0	56.0	54.0
MHD-140CS	67.0	64.0	62.0	60.0	58.0	57.0	55.0
MHD-160CS	68.0	66.0	64.0	62.0	60.0	59.0	57.0

08.02. Octave Band Levels

Figure 08.02.01 MHD-056/71/80CS octave band levels

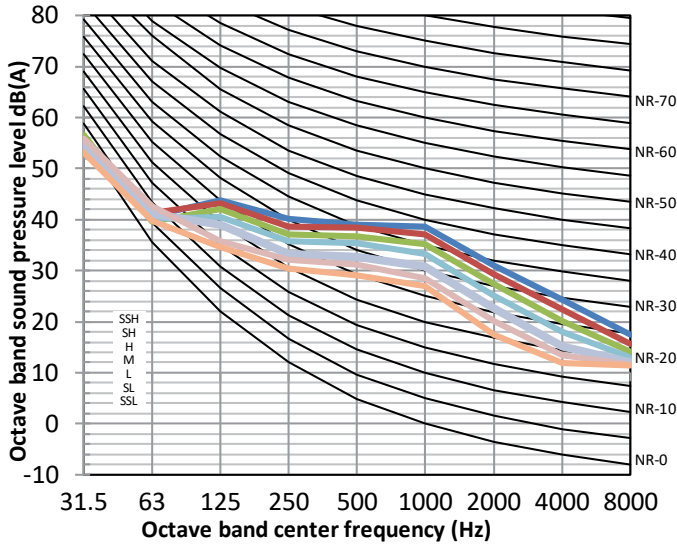


Figure 08.02.02 MHD-090CS octave band levels

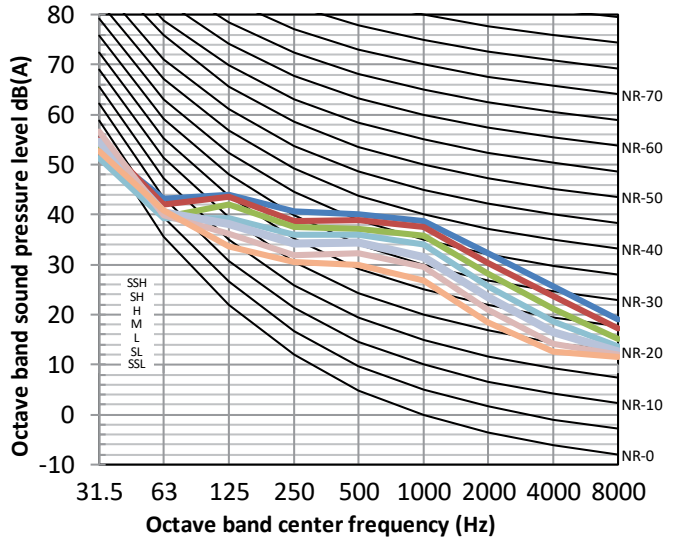


Figure 08.02.03 MHD-112CS octave band levels

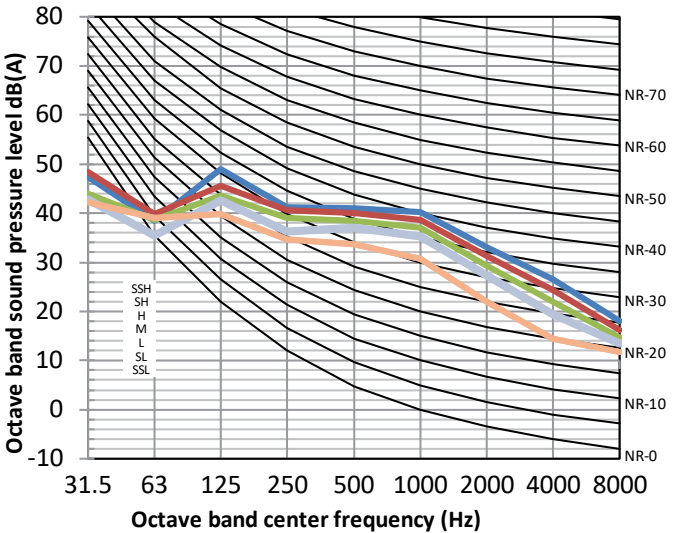


Figure 08.02.04 MHD-125CS octave band levels

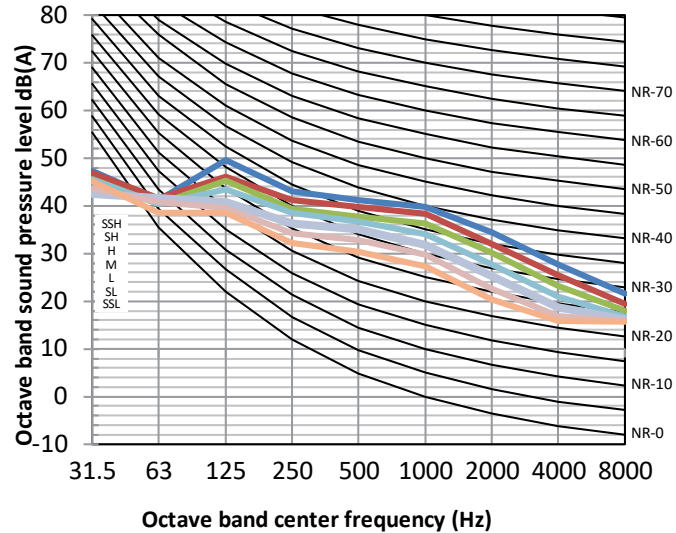


Figure 08.02.05 MHD-140CS octave band levels

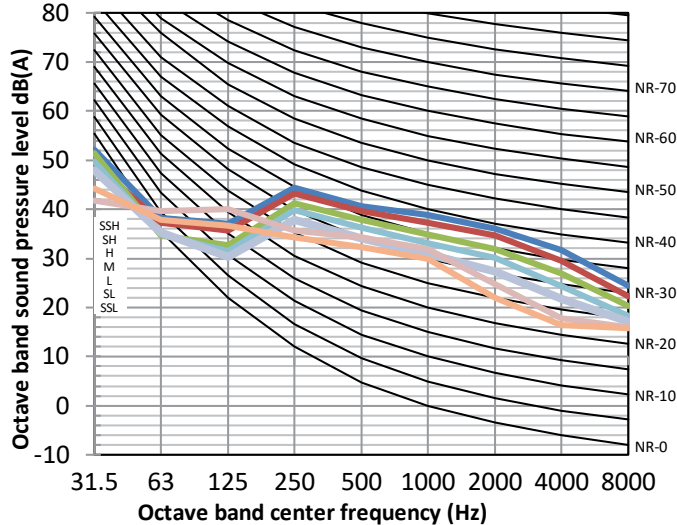
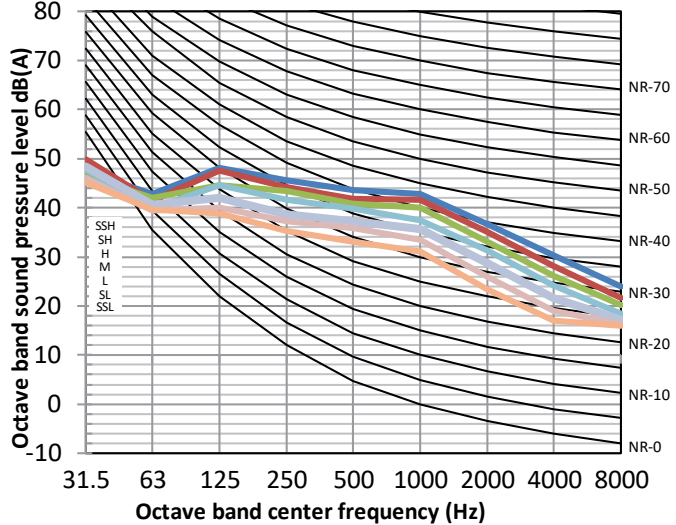


Figure 08.02.06 MHD-160CS octave band levels



09. Fan Performance

09.01. How to switch between Constant Airflow mode and Constant Speed mode

- ① In the main interface, press "≡"+"↶" for 3 seconds at the same time, and the main interface will display "CC". Press the "▲" and "▼" to select the indoor unit ("n00-n63" is displayed, and the last two digits are the indoor unit addresses). Press the "↶" to enter the parameter setting interface, and "n00" will be displayed.
- ② Press the "▲" and "▼" until "N30" is displayed on the page, and then press the "↶" to enter the mode setting. Use the "▲" and "▼" keys to adjust to the demand mode parameter values, and press the "↶" to confirm.
- ③ Press the "⌚" button to return to the previous menu and exit the parameter setting. Parameter setting will also exit after 60 s of no operation.

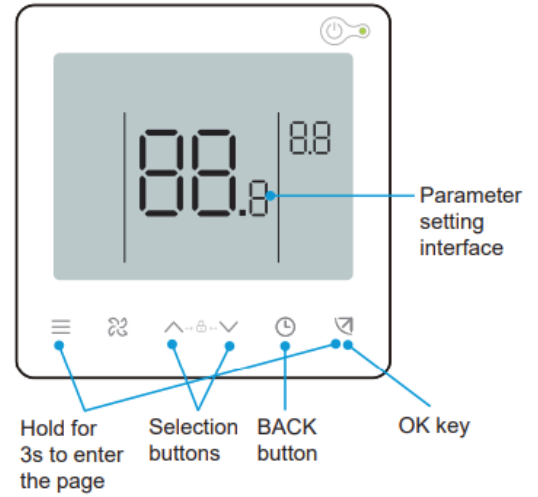


Table 9.1: High Static mode setting

First level menu	Second level menu	Description	Default
n30	00	Constant Speed	-
	01	Constant Airflow	√

Notes:

The above is only an example. If you choose other controllers, please refer to their instructions for setting.

09.02. Constant Airflow mode

09.02.01. Fan performance diagram

Figure 09.02.01 MHD-056/71/80CS

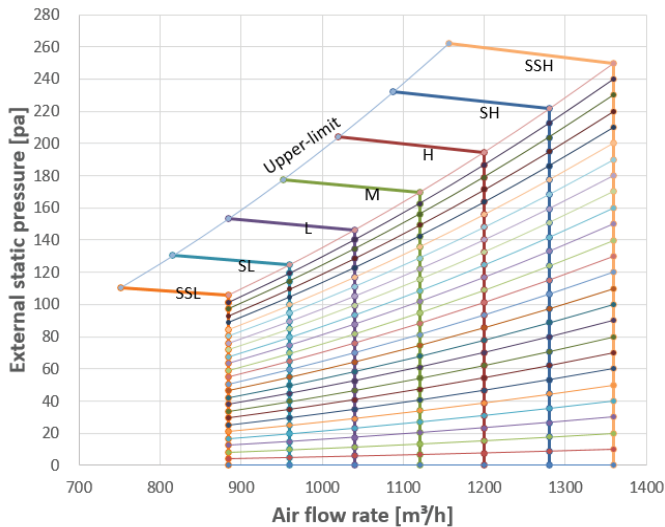


Figure 09.02.02 MHD-090CS

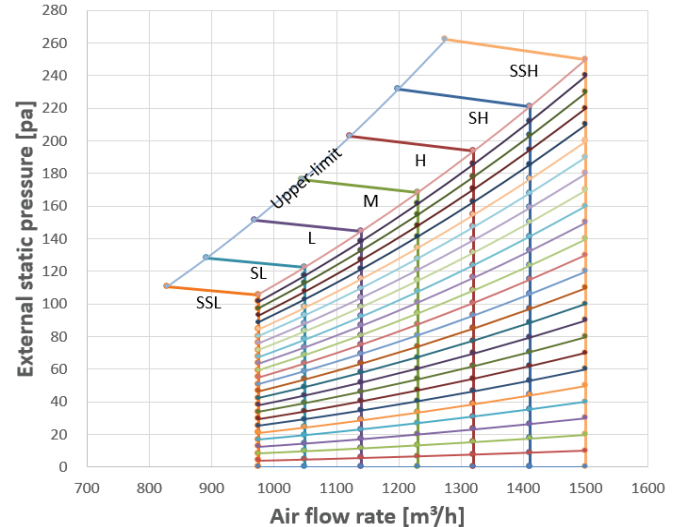


Figure 09.02.03 MHD-112CS

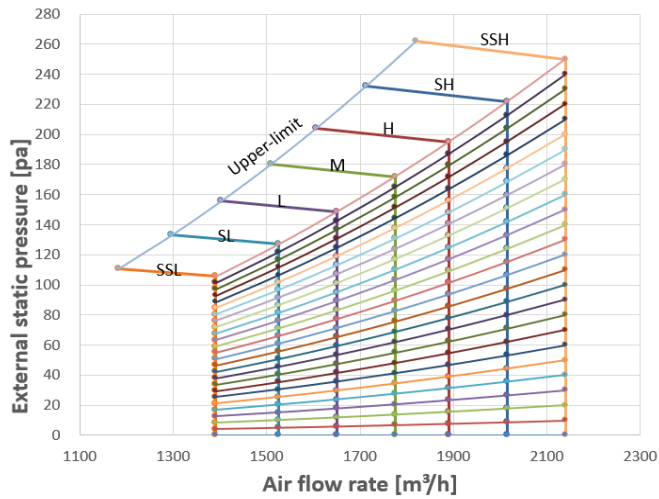


Figure 09.02.04 MHD-125CS

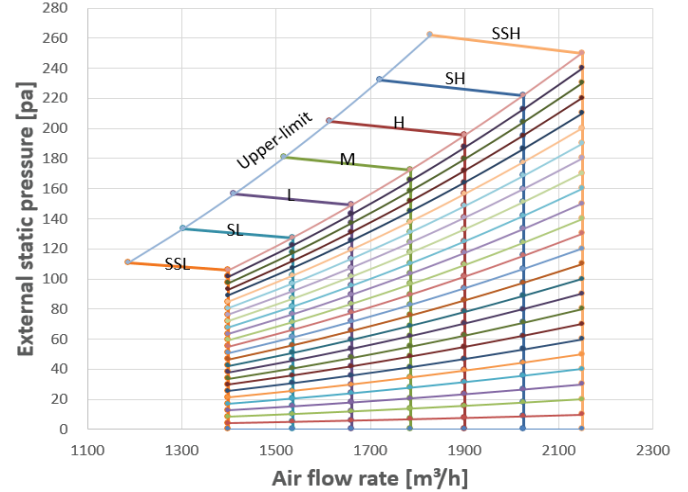


Figure 09.02.05 MHD-140CS

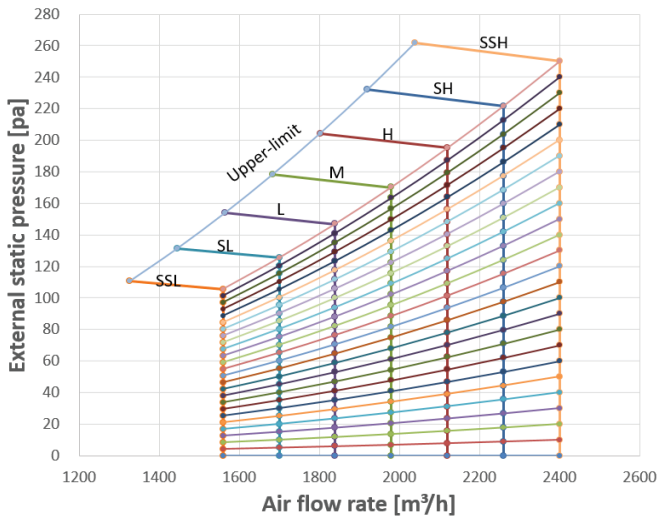
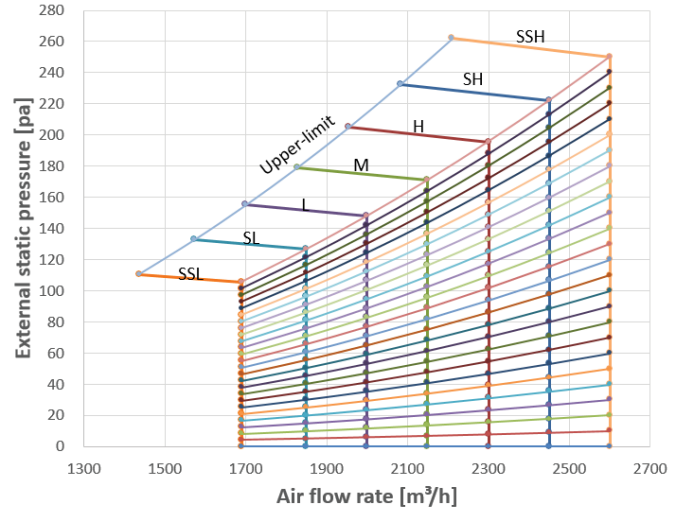


Figure 09.02.06 MHD-160CS



09.02.02. How to Read the Diagram (Constant Airflow mode)

The vertical axis is the External Static Pressure (Pa) while the horizontal axis represents the Air Flow (m3/h). The characteristic curve for the “SSH”, “SH”, “H”, “M”, “L”, “SL” and “SSL” fan speed control.

For MMD-140CS, in “H” windshield, when the external static pressure is less than 122 Pa, the air flow keeps 1837 m3/h, but when the externa static pressure is greater than 122 Pa, the air flow begins to decline, and the allowable maximum external static pressure is 137 Pa.



09.03. Constant Speed mode

09.03.01. Set external static pressure parameters

- ① In the main interface, press "≡"+"↵" for 3 seconds at the same time, and the main interface will display "CC". Press the "▲" and "▼" to select the indoor unit ("n00-n63" is displayed, and the last two digits are the indoor unit addresses). Press the "↵" to enter the parameter setting interface, and "n00" will be displayed.
- ② When "n00" is displayed, press the "↵" to enter the static pressure setting. Use the "▲" and "▼" keys to adjust to the demand parameter values, and press the "↵" to confirm.
- ③ Press the "🕒" button to return to the previous menu and exit the parameter setting. Parameter setting will also exit after 60 s of no operation.

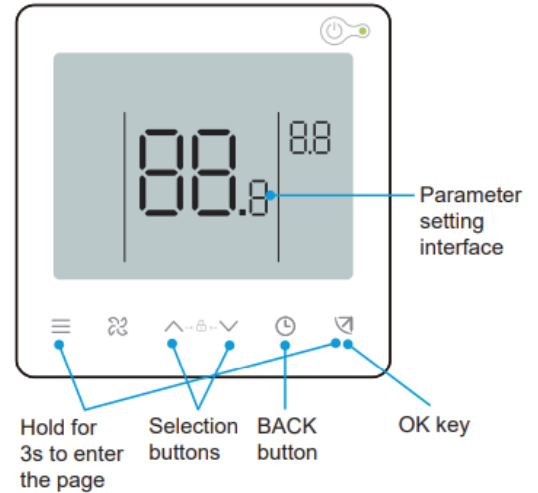


Table 9.1: External static pressure setting

First level menu	Second level menu	Description	Default
n00	00/01/02/03/04/05/~ /19	Static pressure level	08(5.6-11.2kW) 10(12.5-16.0kW)

Level	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
Static pressure(Pa)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	160	180	200	220	250

Notes:

The above is only an example of 86S wired controller. If you choose other controllers, please refer to their manuals for setting.

09.03.02. Fan performance diagram

Figure 09.03.01 MHD-056/71/80CS

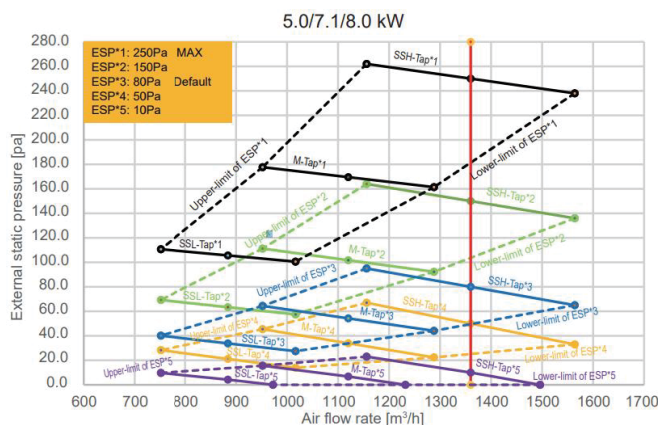


Figure 09.03.02 MHD-090CS

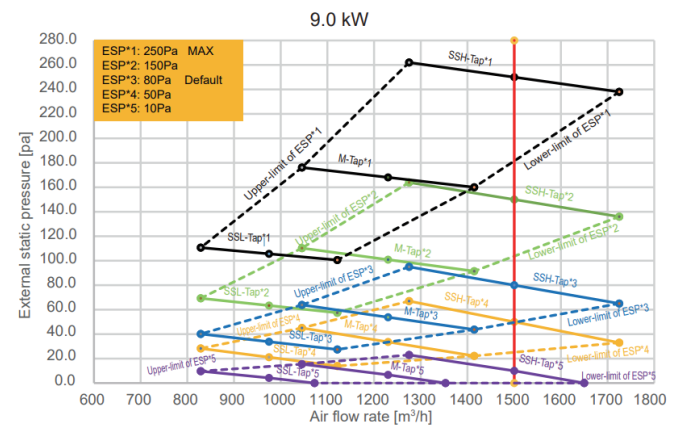


Figure 09.03.03 MHD-112CS

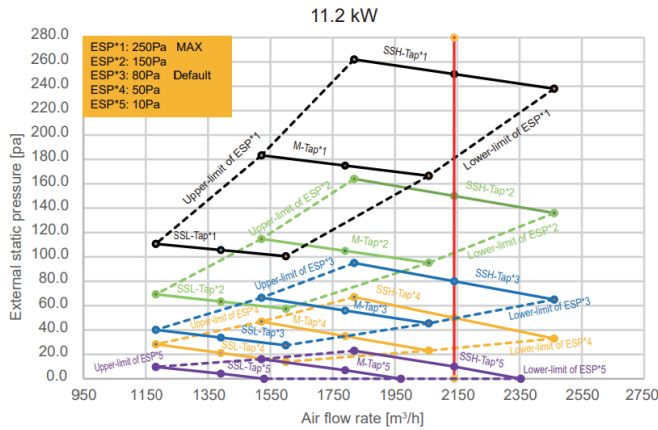


Figure 09.03.04 MHD-125CS

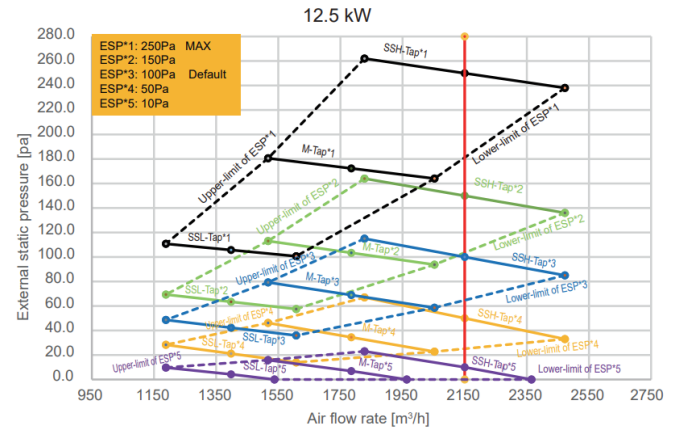


Figure 09.03.05 MHD-140CS

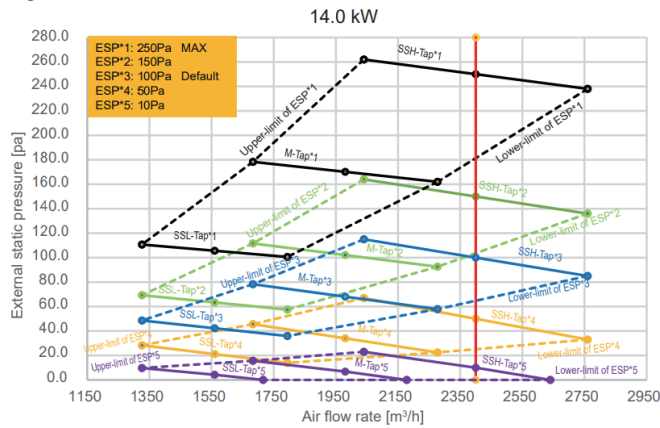
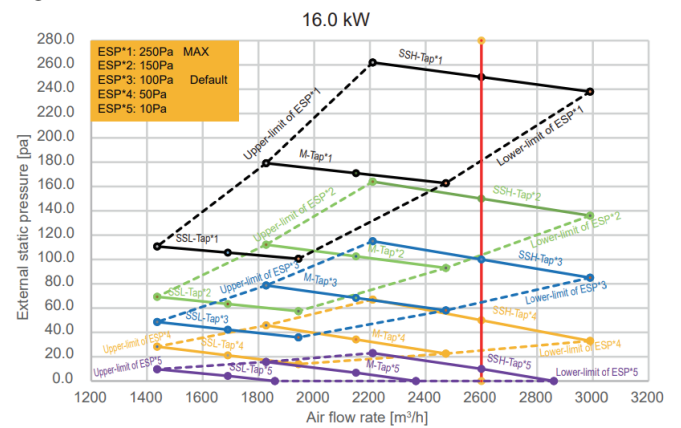


Figure 09.03.06 MHD-160CS

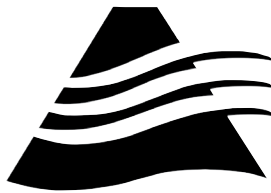


09.03.03. How to Read the Diagram (Constant Speed mode)

The vertical axis is the External Static Pressure (Pa) while the horizontal axis represents the Air Flow (m3/h). The characteristic curve for the “SH”, “M” and “SL” fan speed control.

The Air Flow decreases with the increase of the external static pressure. For MMD-140CS, in “SH” windshield and “50Pa” setting static pressure, when the externa static pressure is 50Pa, the air flow is 2105 m3/h, and the allowable externa static pressure range is 34 to 66.





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