

ECOFLEX MINI VRF FOUR-WAY CASSETTE TECHNICAL SELECTION DATA



Model Numbers

MFC-028CS	MFC-080CS
MFC-036CS	MFC-090CS
MFC-045CS	MFC-100CS
MFC-056CS	MFC-112CS
MFC-071CS	MFC-140CS

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01. Specification

Model			MFC-028CS	MFC-036CS	MFC-045CS	MFC-056CS	MFC-071CS	
Power supply			1-phase, 230V, 50Hz					
Cooling ¹	Capacity	kW	2.8	3.6	4.5	5.6	7.1	
	Power Input	W	17	17	36	23	32	
Heating ²	Capacity	kW	3.2	4.0	5.0	6.3	8.0	
	Power Input	W	17	17	36	23	32	
Fan motor type			DC					
Indoor Coil	Number of rows		1	1	1	2	2	
	Tube pitch × row pitch	mm	18×10.72					
	Fin spacing and type	mm	1.2 Hydrophilic aluminum					
	Tube OD and type	mm	Copper Ø 5 Inner-groove					
	Dimensions (L×H×W)	mm	2165×144×10.72					2165×144×21.44
	Number of circuits		4	4	4	8	8	
Air flow rate ³ (Max / Min) ⁷		l/s	219 / 137	219 / 137	253 / 136	233 / 151	278 / 183	
Sound pressure level ⁴ (Max / Min) ⁷		dB(A)	30 / 25	30 / 25	37 / 27	33 / 27	37 / 28	
Sound power level (Max / Min) ⁷		dB(A)	44 / 39	44 / 39	52 / 40	49 / 44	52 / 44	
Main body	Net dimensions ⁵ (W×H×D)	mm	840×204×840					
	Packed dimensions (W×H×D)	mm	940×250×940					
	Net/Gross weight	kg	18/20.5			19.5/22		
Panel	Net dimensions ⁶ (W×H×D)	mm	950×53×950					
	Packed dimensions (W×H×D)	mm	1020×90×1020					
	Net/Gross weight	kg	5.6/7.3					
Refrigerant type			R-32					
Design pressure (H/L)		MPa	4.4/2.6					
Pipe connections	Liquid and Gas pipe		Ø 6.35 mm and Ø 12.7 mm (1/4" and 1/2")				Ø 9.52 mm and Ø 15.9 mm (3/8" and 5/8")	
	Drain pipe		mm	OD Ø 25				
Notes:								
1. Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.								
2. Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.								
3. Air flow rates are from the highest speed to the lowest speed, total 7 rates for each model.								
4. Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 1.5m below the unit in an semi-anechoic chamber.								
5. 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.								
6. Exposed height of the panel after being installed on the ceiling.								
7. Refer to the section Sound Levels for more details.								

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Model			MFC-080CS	MFC-090CS	MFC-100CS	MFC-112CS	MFC-140CS
Power supply			1-phase, 230V, 50Hz				
Cooling ¹	Capacity	kW	8.0	9.0	10.0	11.2	14.0
	Power Input	W	41	43	74	61	118
Heating ²	Capacity	kW	9.0	10.0	11.2	12.5	16.0
	Power Input	W	41	43	74	61	118
Fan motor type			DC				
Indoor Coil	Number of rows		3	2	2	2	2
	Tube pitch × row pitch	mm	18×10.72				
	Fin spacing and type	mm	1.2 Hydrophilic aluminum				
	Tube OD and type	mm	Copper Ø 5 Inner-groove				
	Dimensions (L×H×W)	mm	2165×144×21.44	2165×198×21.44		2165×252×21.44	
	Number of circuits		8	11	11	14	14
Air flow rate ³ (Max / Min) ⁷		l/s	306 / 171	369 / 218	408 / 225	444 / 272	528 / 339
Sound pressure level ⁴ (Max / Min) ⁷		dB(A)	42.5 / 30	38 / 29	43 / 33	41 / 33	47.5 / 36.5
Sound power level (Max / Min) ⁷		dB(A)	57 / 45	55 / 47	58 / 47	57 / 51	64 / 54
Main body	Net dimensions ⁵ (W×H×D)	mm	840×204×840	840×246×840		840×288×840	
	Packed dimensions (W×H×D)	mm	940×250×940	940×295×940		940×335×940	
	Net/Gross weight	kg	19.5/22	21.5/24		24/26.5	
Panel	Net dimensions ⁶ (W×H×D)	mm	950×53×950				
	Packed dimensions (W×H×D)	mm	1020×90×1020				
	Net/Gross weight	kg	5.6/7.3				
Refrigerant type			R-32				
Design pressure (H/L)		MPa	4.4/2.6				
Pipe connections	Liquid and Gas pipe		Ø 9.52 mm and Ø 15.9 mm (3/8" and 5/8")				
	Drain pipe	mm	OD Ø 25				
Notes:							
1. Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.							
2. Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.							
3. Air flow rates are from the highest speed to the lowest speed, total 7 rates for each model.							
4. Sound pressure level is from highest level to lowest level, total 7 levels for each model. Sound pressure level is measured 1.5m below the unit in an semi-anechoic chamber.							
5. 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.							
6. Exposed height of the panel after being installed on the ceiling.							
7. Refer to the section Sound Levels for more details.							

02. Dimensions

02.01. Unit Dimensions

Figure 2.1: Four-way Cassette dimensions (unit: mm)

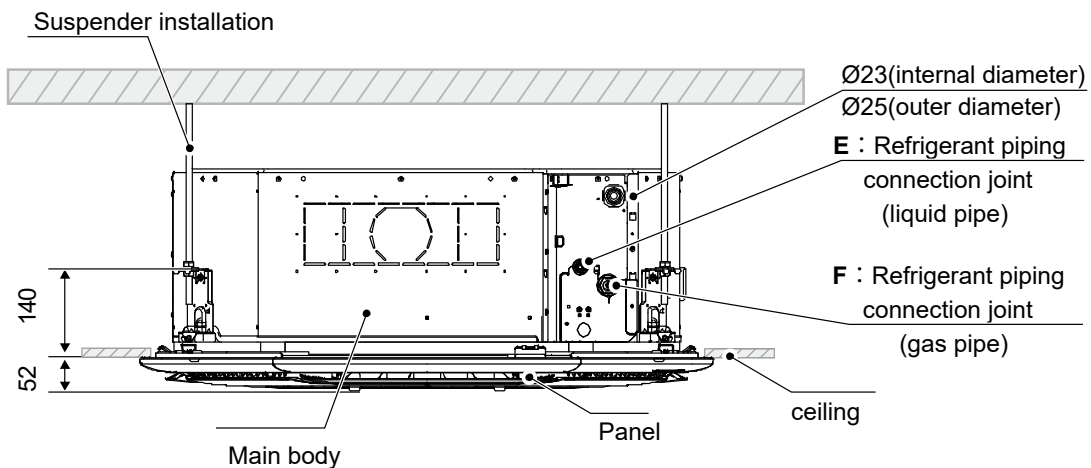
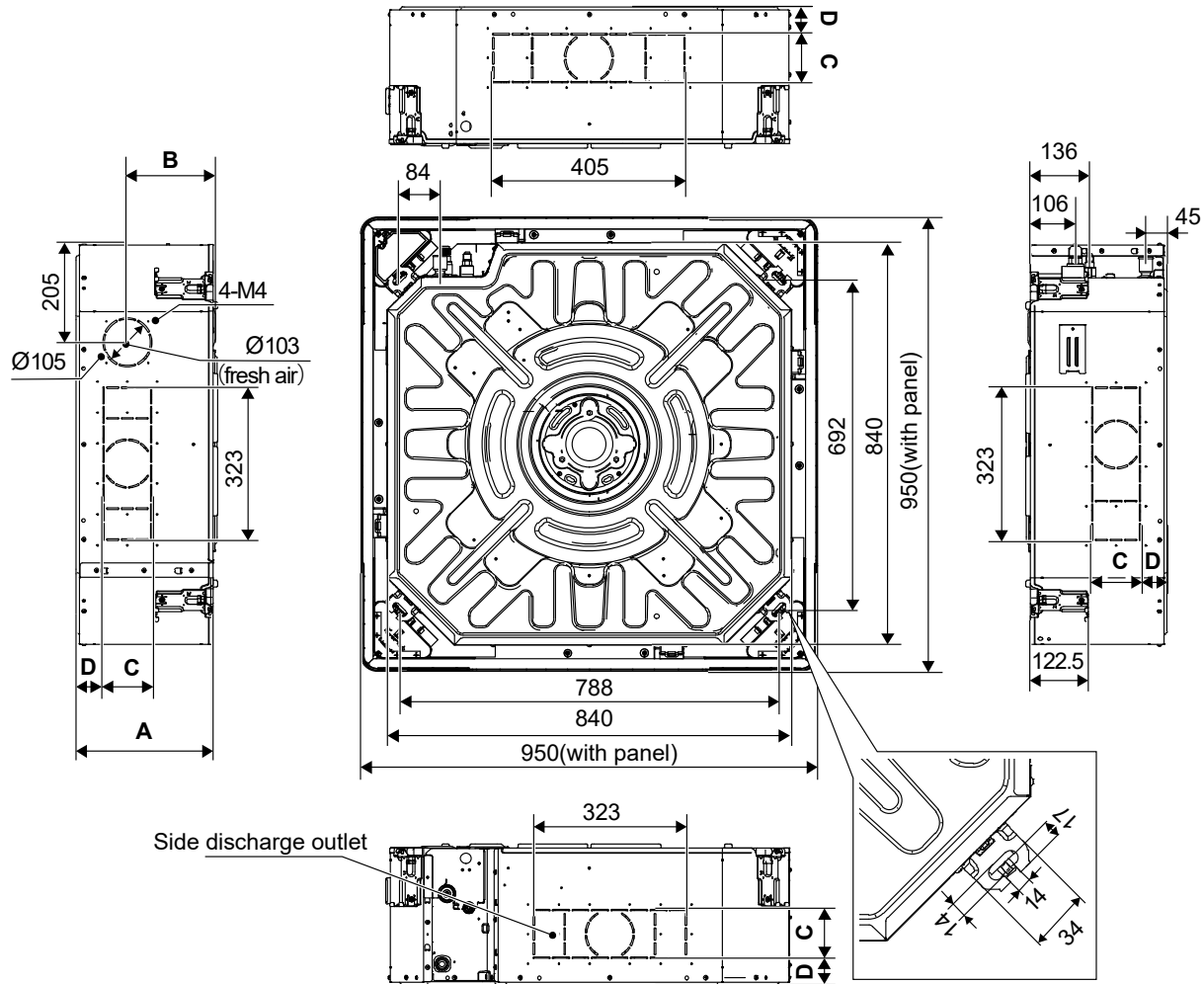


Table 2.1: 2.8-14.0kW Four-way Cassette dimensions (unit: mm)

Model(kW)	A	B	C	D	E	F
2.8-5.6	204	141	63	41.5	Ø 12.7	Ø 6.35
7.1-8.0	204	141	63	41.5	Ø 15.9	Ø 9.52
9.0-10.0	246	163	103	41.5	Ø 15.9	Ø 9.52
11.2-14.0	288	190	103	56.5	Ø 15.9	Ø 9.52

03. Unit Placement

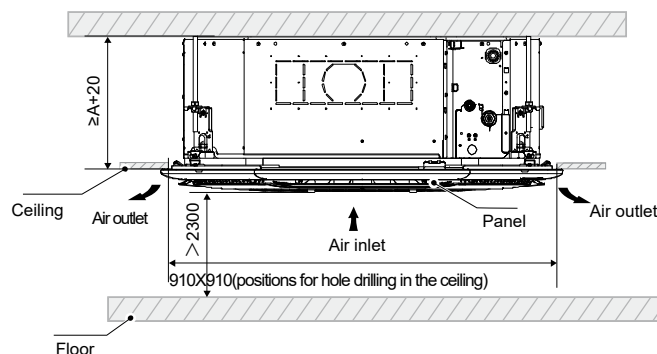
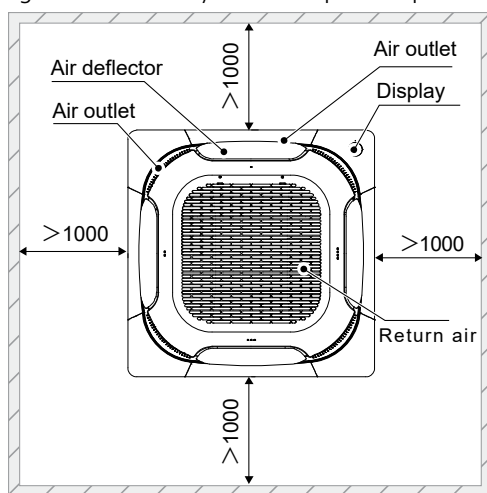
03.01. Placement Considerations

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: Four-way Cassette space requirements (unit: mm)

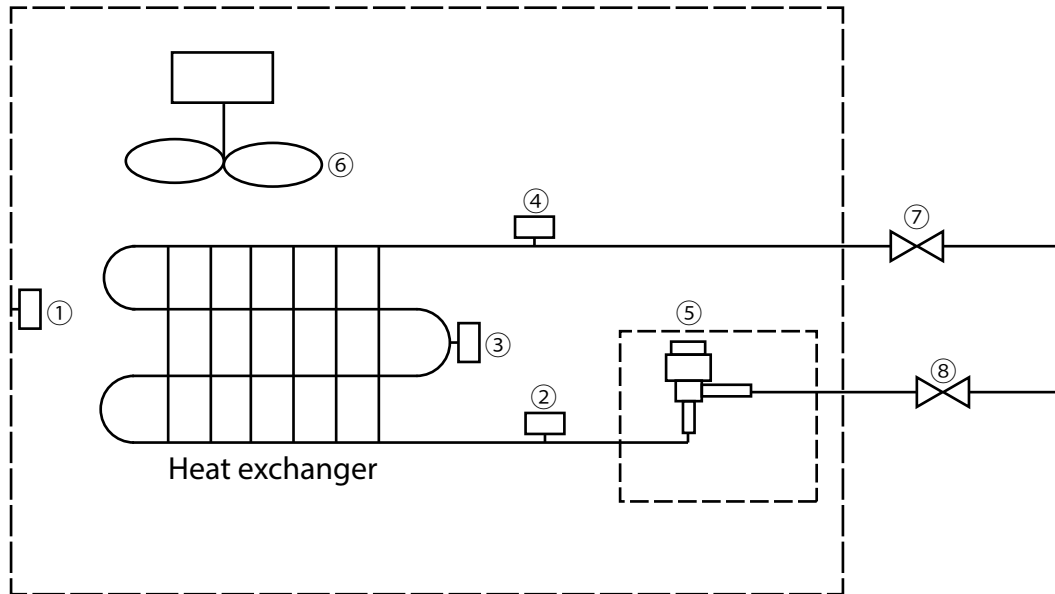


Notes:

1. The centerline of the maintenance hole should be in the same position as the centerline of the indoor unit.
2. The dimensions of A is shown in Table 2.1

04. Piping Diagram

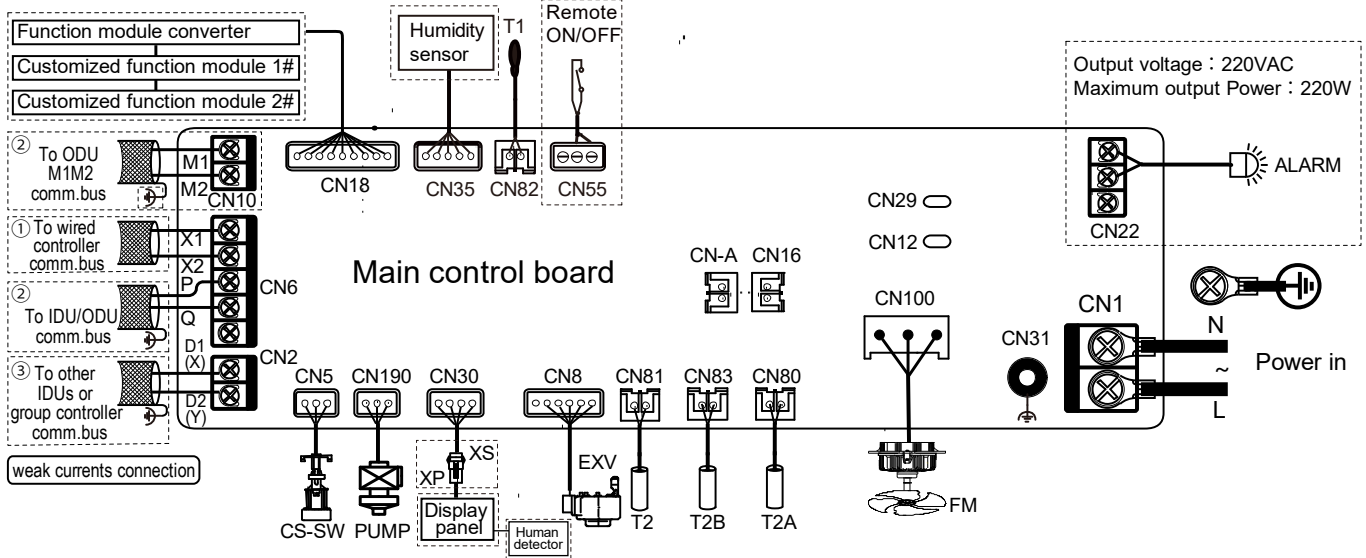
Figure 4.1: Four-way Cassette piping diagram



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: Four-way Cassette wiring diagram



TERMINALS			
Code	Content	Code	Content
CN1	AC power input	CN30	Display panel connection
CN2	D1 D2 communication port(with Central controller)	CN31	
CN5	Water level port	CN35	Humidity sensor connection
CN6	X1 X2 communication port(with wire controller); P Q communication port(with ODU by RS 485)	CN55	Remote on/off switch connection
CN8	EXV drive port	CN80	T2A Temperature sensor connection
CN10	M1 M2 communication port(with ODU by HyperLink)	CN81	T2 Temperature sensor connection
CN12	Reserved	CN82	T1 Ambient Temperature sensor connection
CN16	Reserved	CN83	T2B Temperature sensor connection
CN18	Switch Board	CN100	Power supply for fan motor
CN22	AC power output used for customization function: alarm/strong electric sterilization module	CN190	DC Drainage pump port

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 must 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) to prevent damage to 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 6.1: Four-way Cassette 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
MFC-028CS	2.5	2.4	2.7	2.5	2.8	2.5	2.8	2.4	2.9	2.3	2.9	2.2	3.0	2.1
MFC-036CS	3.2	3.1	3.4	3.1	3.6	3.2	3.6	3.0	3.7	3.0	3.8	2.8	3.9	2.7
MFC-045CS	4.0	3.6	4.3	3.8	4.5	3.8	4.5	3.7	4.6	3.6	4.7	3.4	4.8	3.3
MFC-056CS	5.0	4.5	5.3	4.6	5.6	4.7	5.6	4.6	5.7	4.5	5.8	4.2	6.0	4.1
MFC-071CS	6.3	5.7	6.7	5.8	7.0	5.9	7.1	5.8	7.2	5.6	7.4	5.4	7.6	5.2
MFC-080CS	7.1	6.6	7.6	6.7	7.9	6.8	8.0	6.6	8.1	6.4	8.3	6.1	8.5	5.8
MFC-090CS	8.0	7.2	8.5	7.4	8.9	7.5	9.0	7.3	9.1	7.1	9.4	6.8	9.6	6.5
MFC-100CS	8.9	8.1	9.5	8.4	9.9	8.4	10.0	8.2	10.1	7.9	10.4	7.6	10.6	7.2
MFC-112CS	9.9	9.1	10.6	9.3	11.1	9.4	11.2	9.2	11.3	8.9	11.6	8.4	11.9	8.1
MFC-140CS	12.4	11.0	13.2	11.4	13.8	11.5	14.0	11.3	14.2	11.0	14.5	10.5	14.9	10.1

Abbreviations:

TC: Total capacity (kW)

SC: Sensible capacity(kW)

Notes:

Shaded cells indicate rated conditions.

06.02. Heating Capacity Table

Table 6.2: Four-way Cassette heating capacity

Model	Indoor air temperature (°C DB)					
	16	18	20	21	22	24
	SHC	SHC	SHC	SHC	SHC	SHC
MFC-028CS	3.4	3.4	3.2	3.1	3.0	2.8
MFC-036CS	4.2	4.2	4.0	3.8	3.8	3.5
MFC-045CS	5.3	5.3	5.0	4.8	4.7	4.4
MFC-056CS	6.7	6.6	6.3	6.1	5.9	5.5
MFC-071CS	8.5	8.4	8.0	7.8	7.5	7.0
MFC-080CS	9.5	9.5	9.0	8.7	8.5	7.8
MFC-090CS	10.6	10.5	10.0	9.7	9.4	8.8
MFC-100CS	11.9	11.8	11.2	10.9	10.5	9.8
MFC-112CS	13.3	13.1	12.5	12.1	11.8	10.9
MFC-140CS	17.0	16.8	16.0	15.5	15.0	13.9

Abbreviations:

SHC: Sensible heating capacity(kW)

Notes:

Shaded cells indicate rated conditions.

07. Electrical Characteristics

Table 7.1: Four-way Cassette electrical characteristics

Model	Power Supply						Indoor Fan Motors	
	Hz	Rated Volts	Min. volts	Max. volts	MCA	MFA	Rated motor output (kW)	FLA
MFC-028CS	50	230	217	243	0.27	15	0.045	0.22
MFC-036CS	50	230	217	243	0.27	15	0.045	0.22
MFC-045CS	50	230	217	243	0.52	15	0.045	0.41
MFC-056CS	50	230	217	243	0.33	15	0.045	0.26
MFC-071CS	50	230	217	243	0.42	15	0.045	0.33
MFC-080CS	50	230	217	243	0.63	15	0.045	0.51
MFC-090CS	50	230	217	243	0.58	15	0.045	0.46
MFC-100CS	50	230	217	243	0.91	15	0.045	0.72
MFC-112CS	50	230	217	243	0.78	15	0.125	0.62
MFC-140CS	50	230	217	243	1.42	15	0.125	1.14

Abbreviations:

MCA: Minimum Circuit Amps

MFA: Maximum Fuse Amps

FLA: Full Load Amps

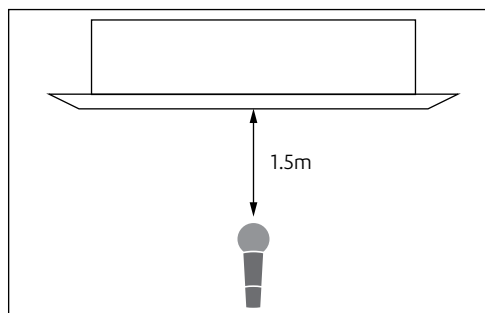
08. Sound Levels

08.01. Overall

Table 8.1.1: Four-way Cassette sound pressure levels¹

Model	Sound pressure levels dB						
	SSH	SH	H	M	L	SL	SSL
MFC-028CS	30	29	28	27.5	27	26	25
MFC-036CS	30	29	28	27.5	27	26	25
MFC-045CS	37	35	34	32	30	29	27
MFC-056CS	33	32	31	30	29	28	27
MFC-071CS	37	36	34	33	31	30	28
MFC-080CS	42.5	40	38	36	34	32	30
MFC-090CS	38	37	35	34	32	31	29
MFC-100CS	43	41	40	38	36	35	33
MFC-112CS	41	40	38	37	36	34	33
MFC-140CS	47.5	46	44	42	40	38	36.5

Figure 8.1.1: Four-way Cassette sound pressure level measurement



Notes:

- (1) Sound pressure levels are measured 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.

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Table 8.1.2: Compact Four-way Cassette
Air flow rate.

Model	Air Flow Rate						
	SSH	SH	H	M	L	SL	SSL
MFC-028CS	219	206	192	178	164	151	137
MFC-036CS	219	206	192	178	164	151	137
MFC-045CS	253	233	214	195	175	156	136
MFC-056CS	233	220	206	192	178	165	151
MFC-071CS	278	262	246	230	214	199	183
MFC-080CS	306	283	261	238	216	194	171
MFC-090CS	369	344	319	294	268	243	218
MFC-100CS	408	378	347	317	286	256	225
MFC-112CS	444	416	387	358	329	301	272
MFC-140CS	528	496	465	433	402	370	339

Table 8.1.3: Compact Four-way Cassette
Sound power level.

Model	Sound power levels dB						
	SSH	SH	H	M	L	SL	SSL
MFC-028CS	44	43	42	42	41	40	39
MFC-036CS	44	43	42	42	41	40	39
MFC-045CS	52	51	49	47	45	43	40
MFC-056CS	49	48	47	47	46	45	44
MFC-071CS	52	51	50	48	47	45	44
MFC-080CS	57	55	53	51	49	47	45
MFC-090CS	55	54	52	51	50	48	47
MFC-100CS	58	57	55	53	51	49	47
MFC-112CS	57	56	55	54	53	52	51
MFC-140CS	64	63	61	60	58	56	54

08.02. Octave Band Levels

Figure 8.2. 1 MFC-028CS octave band levels

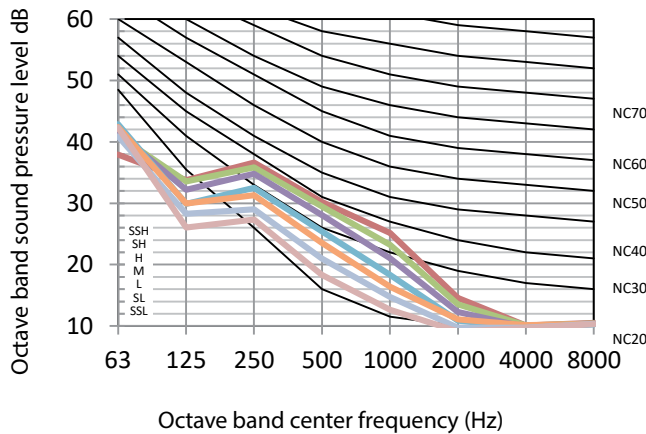


Figure 8.2. 2 MFC-036CS octave band levels

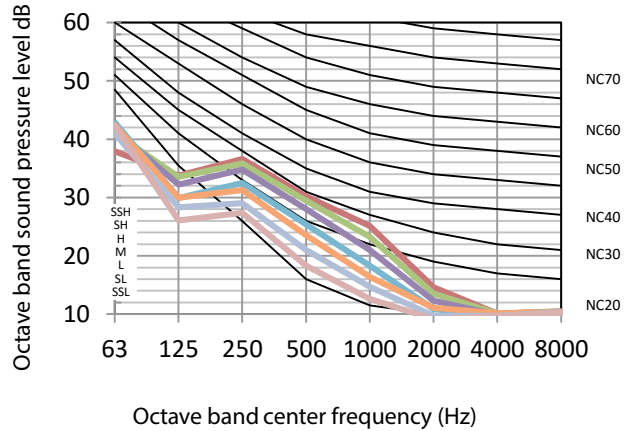


Figure 8.2. 3 MFC-045CS octave band levels

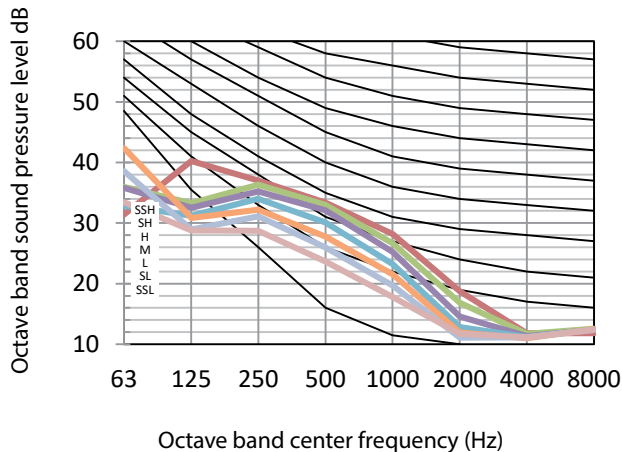
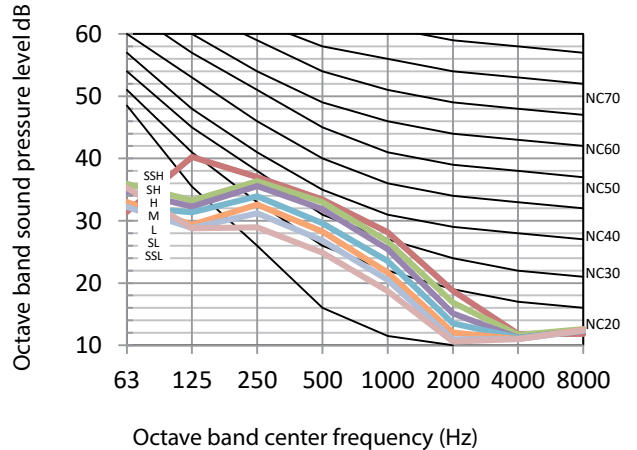


Figure 8.2. 4 MFC-056CS octave band levels



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Figure 8.2. 5 MFC-071CS octave band levels

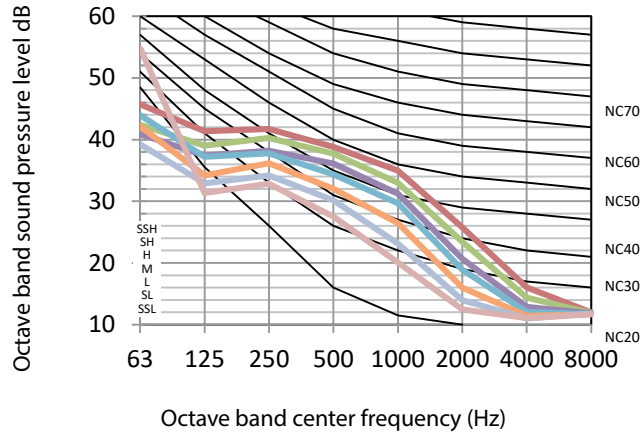


Figure 8.2. 6 MFC-080CS octave band levels

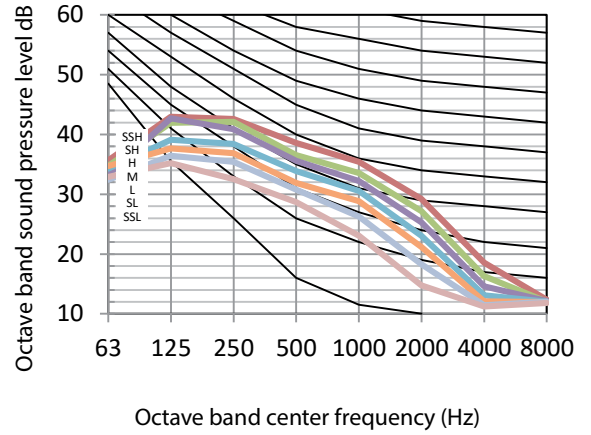


Figure 8.2. 7 MFC-090CS octave band levels

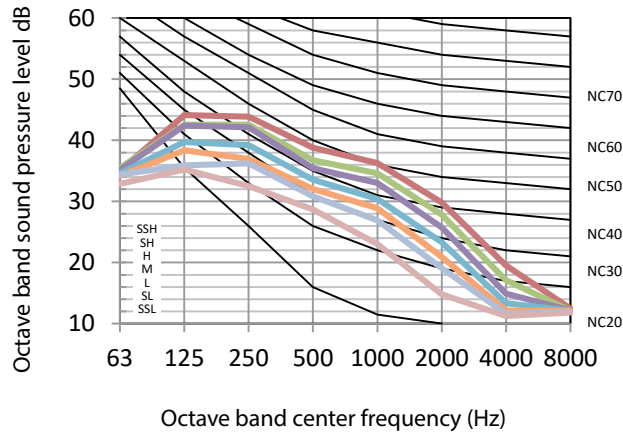


Figure 8.2. 8 MFC-100CS octave band levels

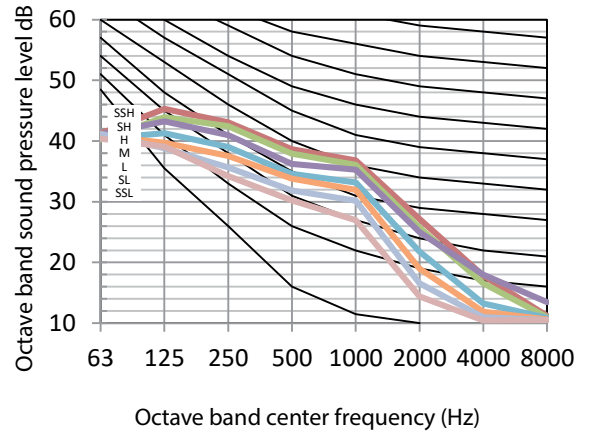


Figure 8.2. 9 MFC-112CS octave band levels

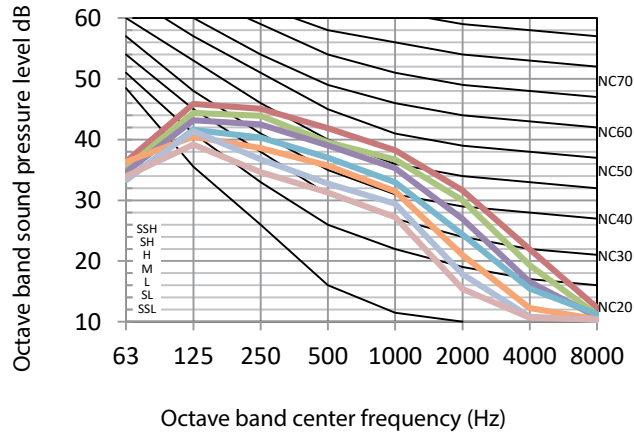
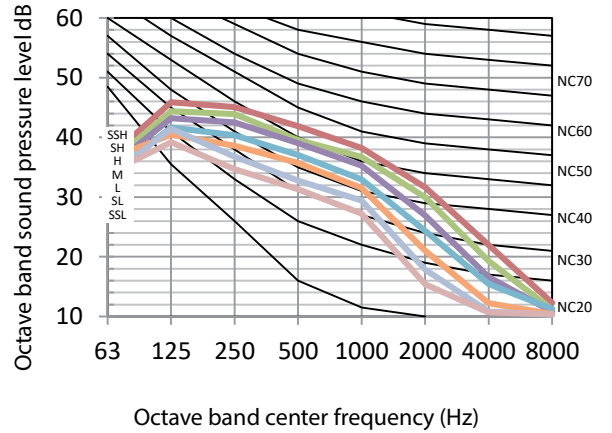


Figure 8.2. 10 MFC-140CS octave band levels



09. Temperature and Airflow Distributions

09.01. Simulate condition

Table 9.1: Four-way Cassette simulate condition

Models	Room size (m)	Ceiling height (m)	Flow angle (Cooling/Heating)	Placing
MFC-028CS	6×6	2.7	30°/65°	Center
MFC-036CS	6×6	2.7	30°/65°	Center
MFC-045CS	6×6	2.7	30°/65°	Center
MFC-056CS	8×8	2.7	30°/65°	Center
MFC-071CS	8×8	2.7	30°/65°	Center
MFC-080CS	8×8	2.7	30°/65°	Center
MFC-090CS	10×10	2.7	30°/65°	Center
MFC-100CS	10×10	2.7	30°/65°	Center
MFC-112CS	10×10	2.7	30°/65°	Center
MFC-140CS	10×10	2.7	30°/65°	Center

Note:

1. These figures and videos are based on software simulation. They show typical temperature and airflow distributions in the conditions above. In the actual installation, they may differ from these figures and videos under the influence of air temperature conditions, ceiling height, cooling/heating load, obstacles, etc.

09.02. Airflow distributions

In the below charts, Y-Axis represents the height in meters (charts shows the installation height at 2.5m) and the X-Axis represents the floor distance in meters. These chart shows the air speed distribution 300s after the machine is turned on. The data in the curves shows air speed in meter per seconds (eg: 0.5 means the air speed in that area is 0.5m/s).

Figure 9.2.1 MFC-028CS cooling at 300s

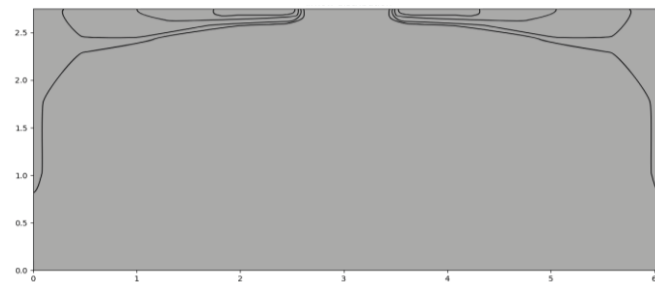


Figure 9.2.2 MFC-028CS heating at 300s

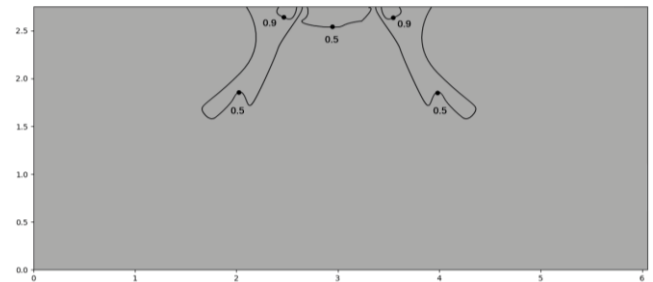


Figure 9.2.3 MFC-036CS cooling at 300s

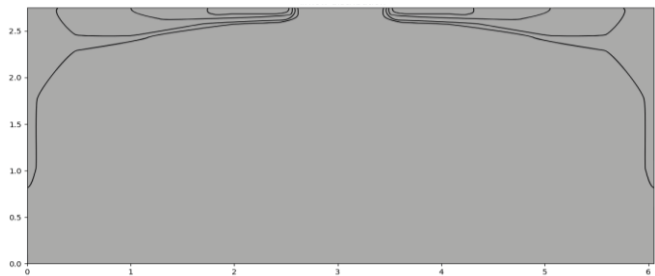


Figure 9.2.4 MFC-036CS heating at 300s

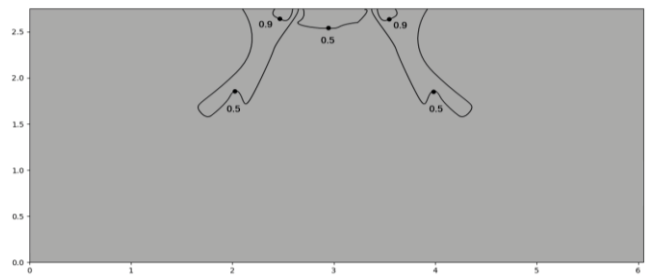


Figure 9.2.5 MFC-045CS cooling at 300s

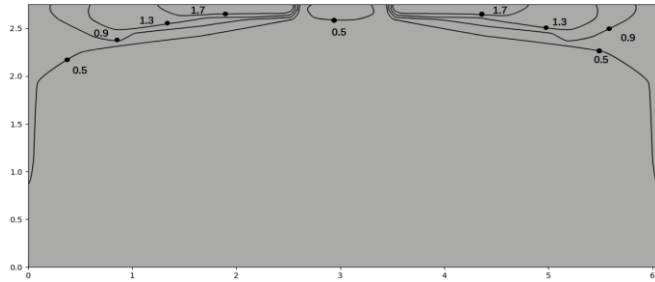


Figure 9.2.6 MFC-045CS heating at 300s

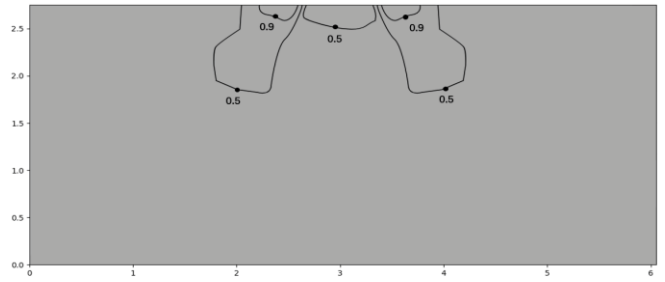


Figure 9.2.7 MFC-056CS cooling at 300s

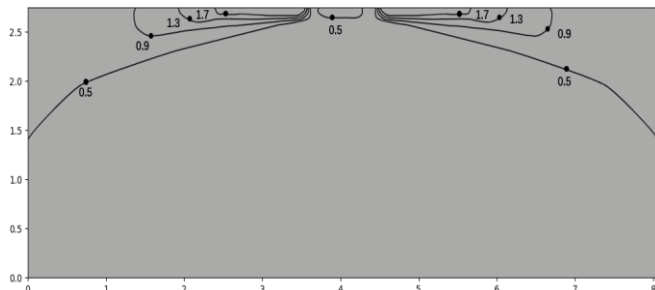


Figure 9.2.8 MFC-056CS heating at 300s

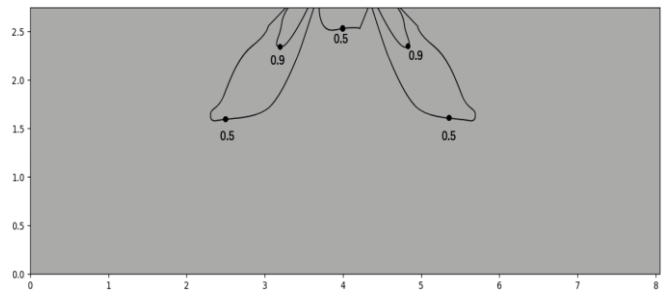


Figure 9.2.9 MFC-071CS cooling at 300s

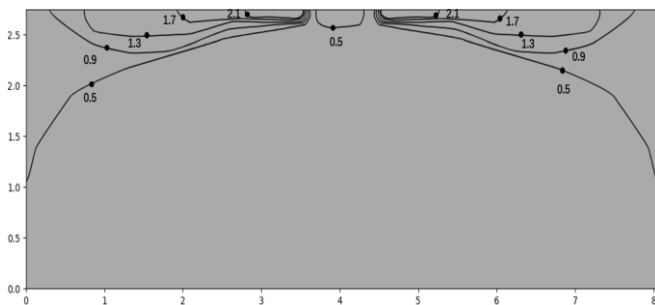


Figure 9.2.10 MFC-071CS heating at 300s

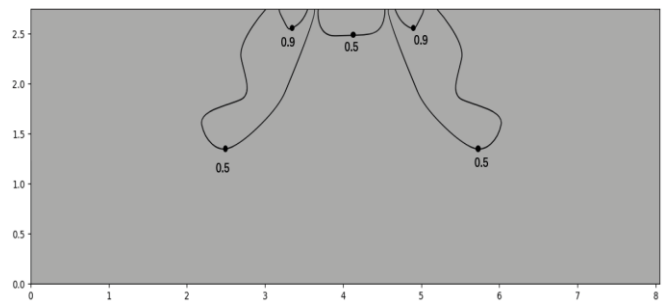


Figure 9.2.11 MFC-080CS cooling at 300s

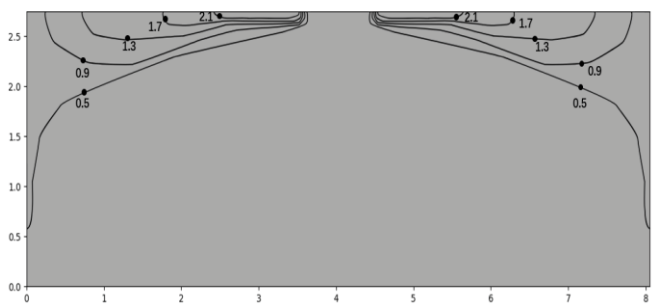


Figure 9.2.12 MFC-080CS heating at 300s

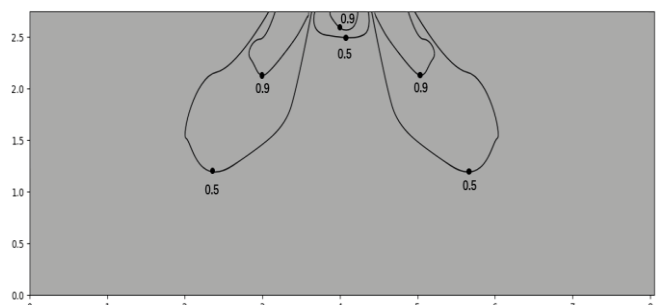


Figure 9.2.13 MFC-090CS cooling at 300s

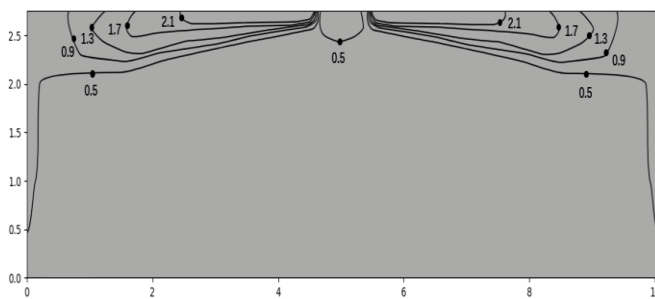


Figure 9.2.14 MFC-090CS heating at 300s

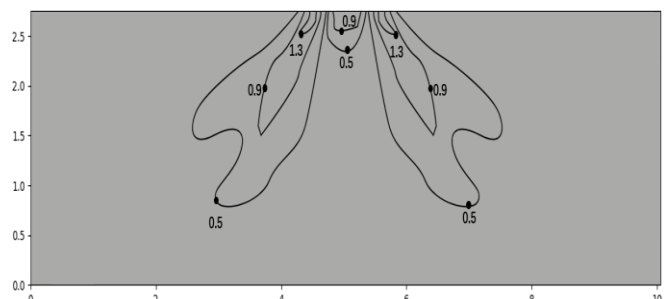


Figure 9.2.15 MFC-100CS cooling at 300s

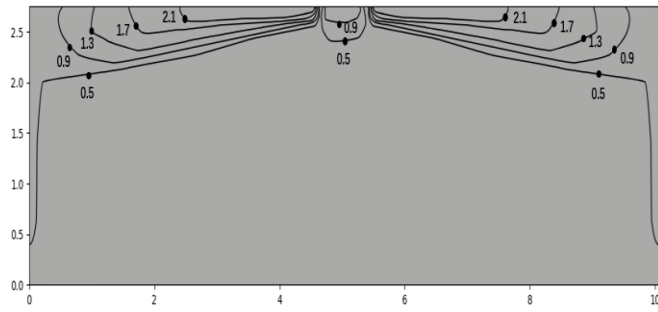


Figure 9.2.16 MFC-100CS heating at 300s

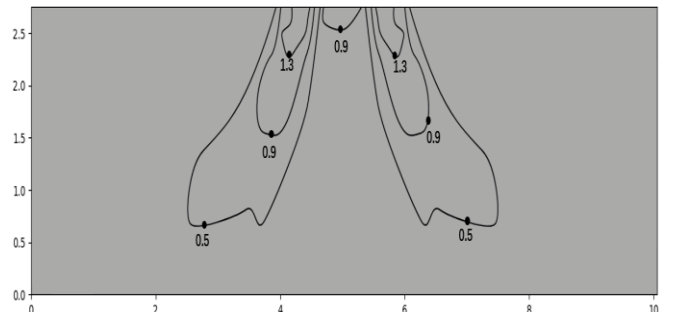


Figure 9.2.17 MFC-112CS cooling at 300s

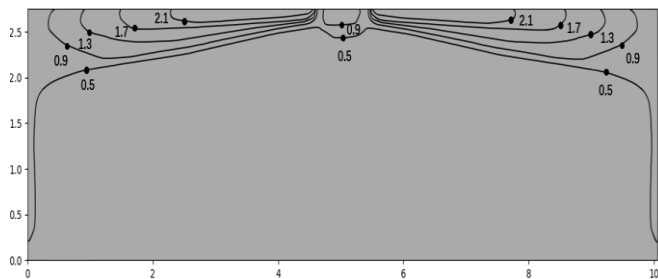


Figure 9.2.18 MFC-112CS heating at 300s

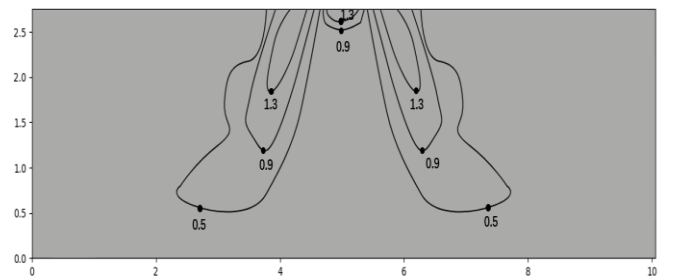


Figure 9.2.19 MFC-140CS cooling at 300s

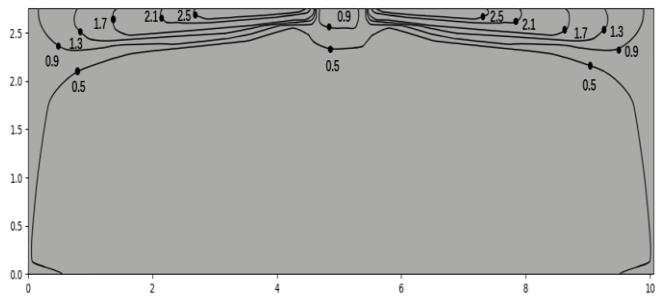
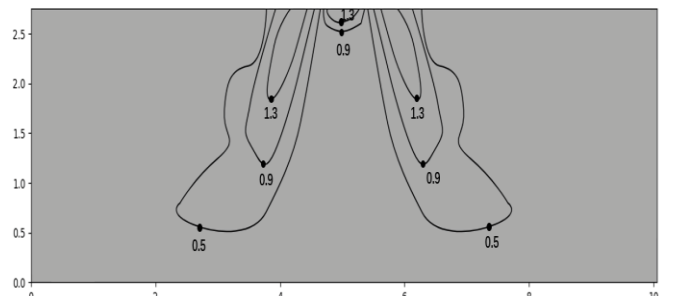


Figure 9.2.20 MFC-140CS heating at 300s



09.03. Temperature distributions

In the below charts, Y-Axis represents the height in meters (charts shows the installation height at 2.5m) and the X-Axis represents the floor distance in meters. These chart shows the air speed distribution 300s after the machine is turned on. The data in the curves shows temperature distribution.

Figure 9.3.1 MFC-028CS cooling at 300s

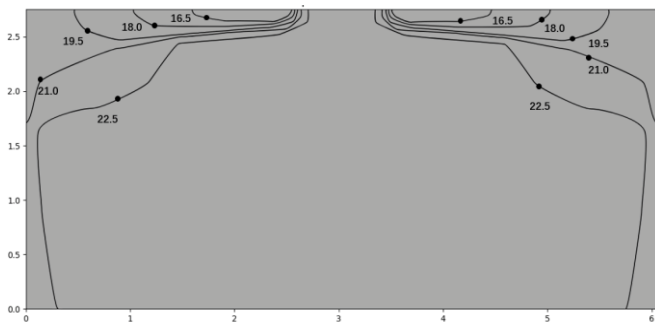
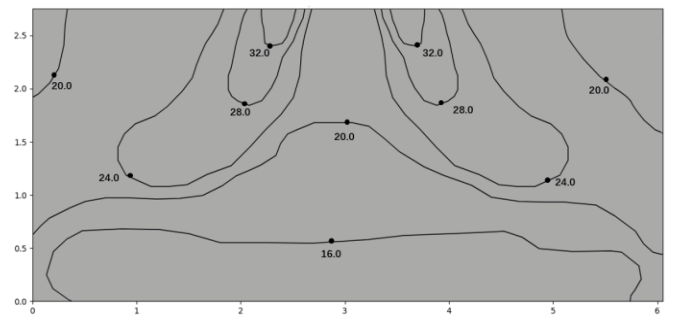


Figure 9.3.2 MFC-028CS heating at 300s



TECHNICAL SELECTION DATA

ECOFLEX - Mini VRF

Figure 9.3.3 MFC-036CS cooling at 300s

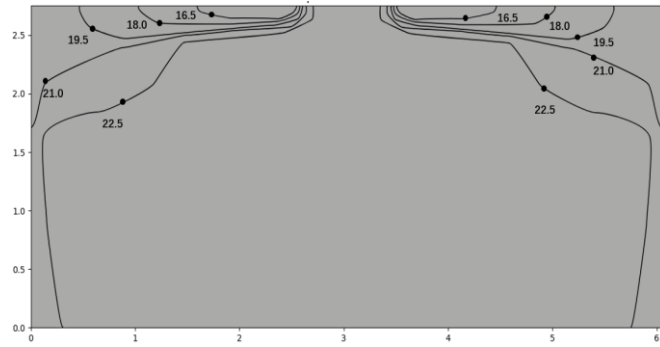


Figure 9.3.4 MFC-036CS heating at 300s

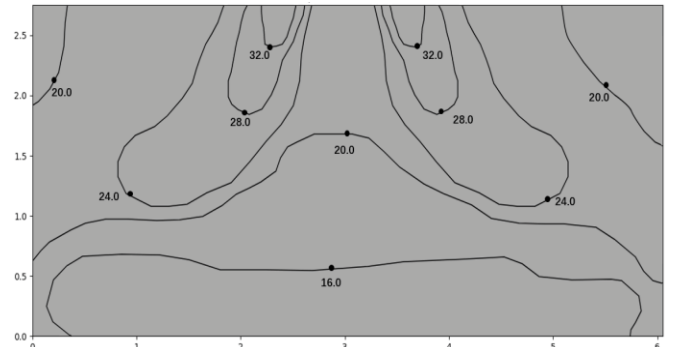


Figure 9.3.5 MFC-045CS cooling at 300s

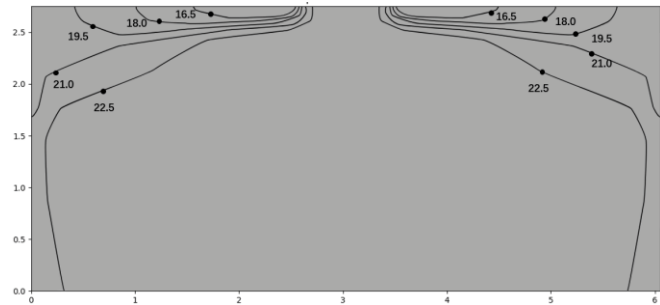


Figure 9.3.6 MFC-045CS heating at 300s

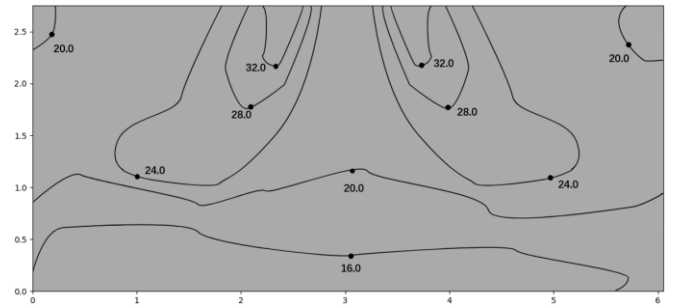


Figure 9.3.7 MFC-056CS cooling at 300s

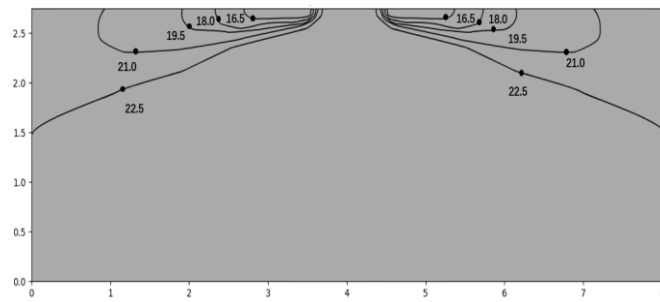


Figure 9.3.8 MFC-056CS heating at 300s

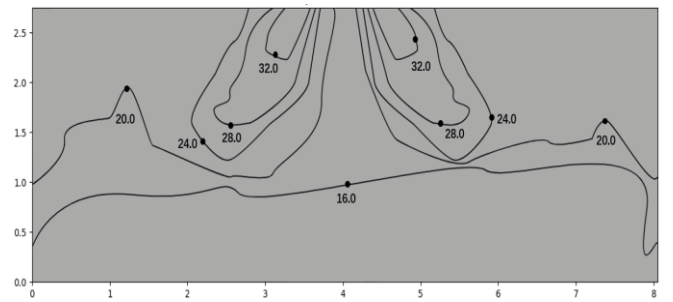


Figure 9.3.9 MFC-071CS cooling at 300s

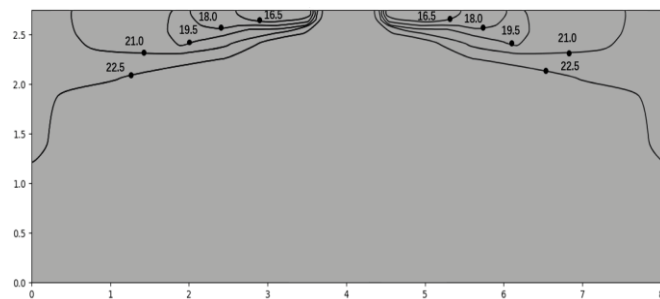
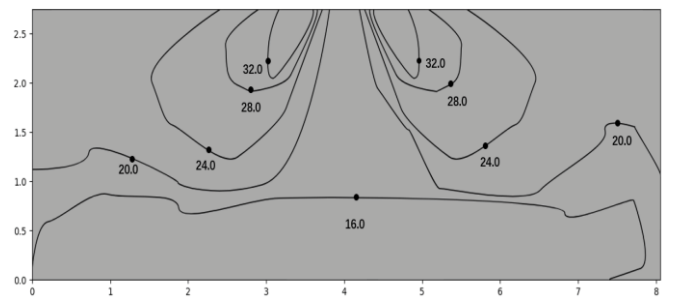


Figure 9.3.10 MFC-071CS heating at 300s



TECHNICAL SELECTION DATA

ECOFLEX - Mini VRF

Figure 9.3.11 MFC-080CS cooling at 300s

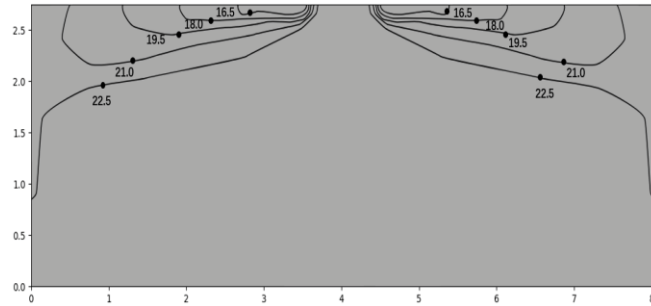


Figure 9.3.12 MFC-080CS heating at 300s

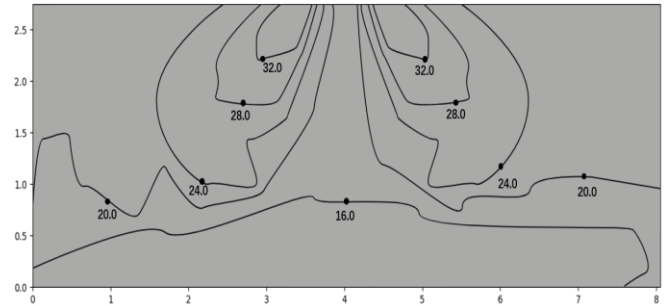


Figure 9.3.13 MFC-090CS cooling at 300s

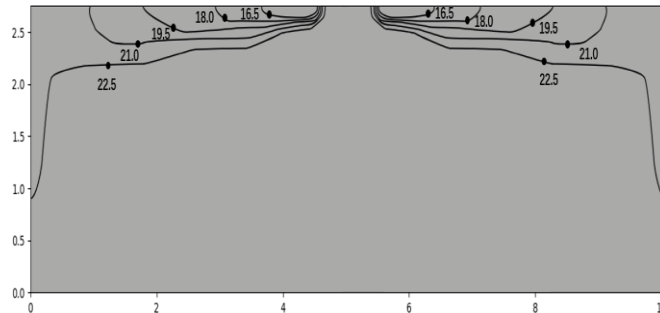


Figure 9.3.14 MFC-090CS heating at 300s

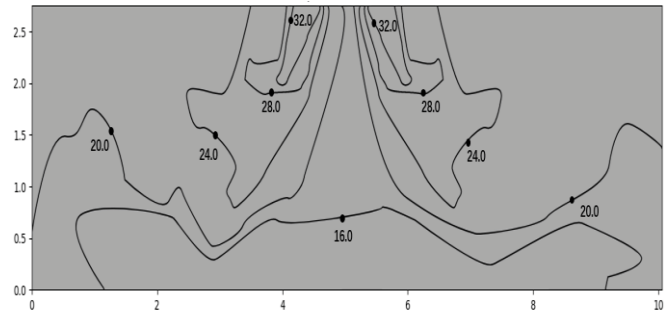


Figure 9.3.15 MFC-100CS cooling at 300s

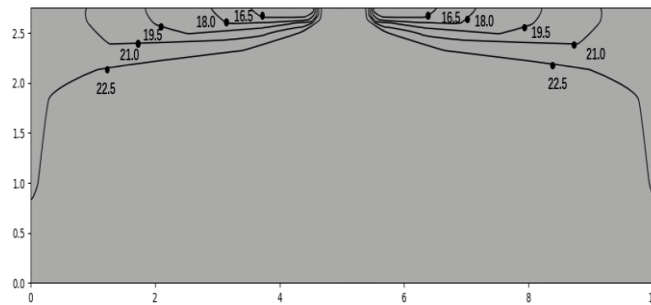


Figure 9.3.16 MFC-100CS heating at 300s

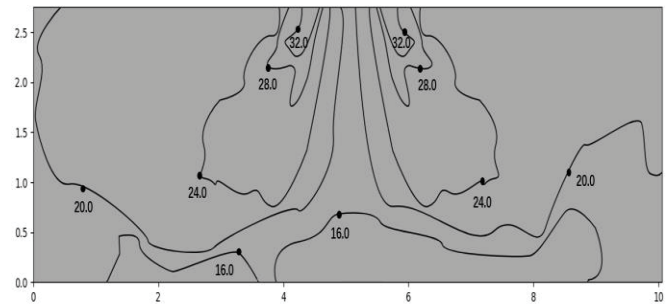


Figure 9.3.17 MFC-112CS cooling at 300s

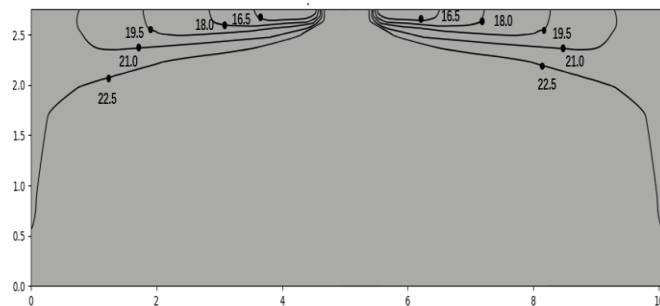


Figure 9.3.18 MFC-112CS heating at 300s

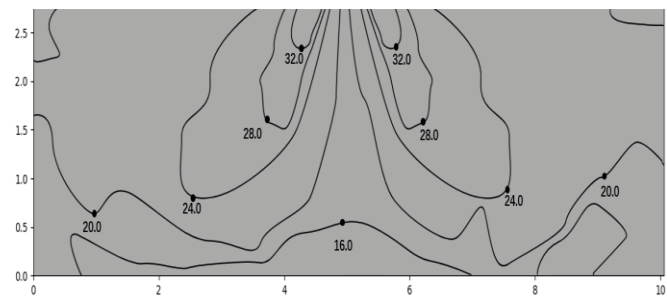


Figure 9.3.19 MFC-140CS cooling at 300s

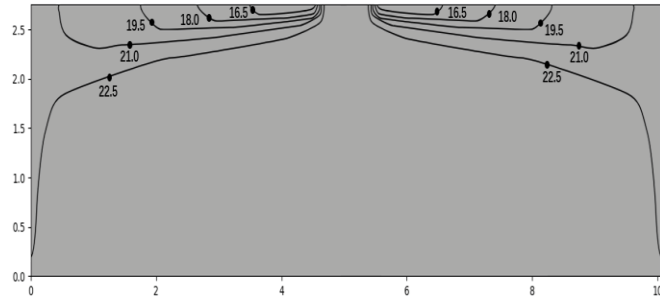
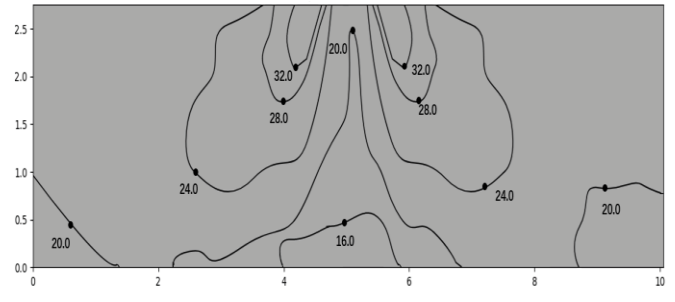
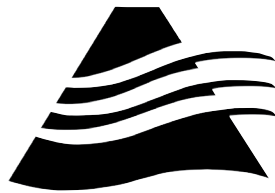


Figure 9.3.20 MFC-140CS heating at 300s





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