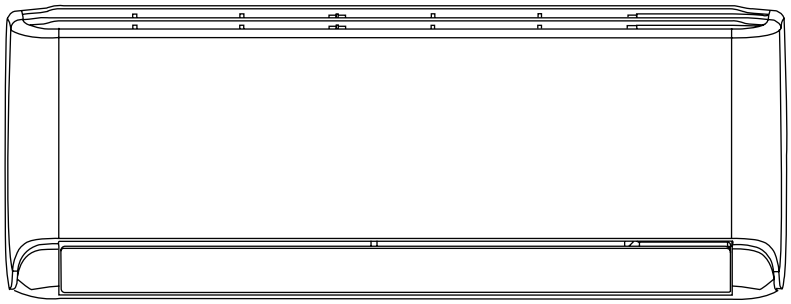
TECHNICAL MANUAL

EX R32 3D INVERTER CONTROL



INDOOR UNIT
MSEX1BU-12HRFN8-QRE1GW

OUTDOOR UNIT
MOX430-12HFN8-QRE1GW

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1. Specifications

1.1 Technical Specifications

Model			MSEX1BU-12HRFN8-QRE1GW+ MOX430-12HFN8-QRE1GW
Power supply		V- Ph-Hz	220-240-1-50
Rated Power Input		W	2950
Rated Current		A	13
Compressor	Model		KTM140D79UFZA3
	Type		ROTARY
	Brand		GMCC
	Capacity	W	2720/4400
	Input	W	405/1115
	Rated current(RLA)	A	2.98/7.55
	Locked rotor Amp(LRA)	A	/
	Thermal protector		/
	Thermal protector position		/
	Capacitor	uF	/
	Refrigerant oil/oil charge	ml	POE VG75R 500±10
Indoor fan motor	Model		ZKFP-20-8-6-7
	Input	W	50
	Output	W	20
	Insulation class		E
	Waterproofing class		IPX0
	Capacitor	uF	/
	Speed(Hi/Mi/Lo)	r/min	1000/880/820
Indoor coil	Number of rows		3
	Tube pitch(a)x row pitch(b)	mm	14.5x12.56
	Fin spacing	mm	1.2
	Fin type (code)		Hydrophilic aluminium
	Tube outside dia.and type	mm	Φ5,innergroove tube
	Coil length x height x width	mm	620x87x25.12+620x130.5x37.68+620x101.5x25.12
	Number of circuits		4
Indoor Indoor side air flow(Si/Lo/Mi/Hi/SH)		m^3/h	110/290/370/570/680
Indoor noise level (Turbo/Hi/Mi/Lo/Si)		dB(A)	45/40/32/22/19
Indoor noise (sound power) in refrigeration room		dB(A)	59.0
Indoor unit	Indoor Unit Dimension W×D×H	mm	822×194×309
	Indoor Package Dimension W×D×H	mm	876×290×363
	Indoor Item Net/Gross weight	kg	9.8/12.5
Outdoor fan motor	Model		ZKFN-79-10-1L
	Input	W	80
	Output	W	79
	Insulation class		B
	Waterproofing class		IP44
	Capacitor	uF	/
	Speed	r/min	700/610/530

Outdoor coil	Number of rows		2
	Tube pitch(a)x row pitch(b)	mm	21x22
	Fin spacing	mm	1.3
	Fin type (code)		Hydrophilic aluminum
	Tube outside dia.and type	mm	Φ7,innergroove tube
	Coil length x height x width	mm	900x609x22+865x609x22
	Number of circuits		6
Outdoor Outdoor air flow		m^3/h	3500
Outdoor noise level (Hi)		dB(A)	56
Outdoor noise from refrigeration (sound power)		dB(A)	59
Outdoor unit	Outdoor Unit Dimension W×D×H	mm	890×342×673
	Outdoor Package Dimension W×D×H	mm	995×398×740
	Outdoor Item Net/Gross weight	kg	43.5/47
Refrigerant	Type		R32
	GWP		675
	Charged quantity	kg	1
Design pressure		MPa	4.3/1.7
Refrigerant piping	Liquid side/ Gas side	mm (inch)	Φ6.35/Φ9.52(1/4"/3/8")
	Max. refrigerant pipe length	m	25
	Max. difference in level	m	10
Connection wiring			5x2.5
Thermostat type			Remote Control
Operation temperature			16-30
Ambient temperature	Indoor(cooling/ heating)	°C	16~32/0~30
	Outdoor(cooling/heating)	°C	-15~50/-40~24
Qty'per 20' /40' /40'HQ			142/294/330

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB
-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB
-Interconnecting Piping Length 5m
- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
- Interconnecting Piping Length 5 m
- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

1.2 Electrical Characteristics

Model	Outdoor Unit			Power Supply			IFM		Compressor		OFM		
	Phase	Hz	Voltage	MCA	MOP	MFA	W	FLA	MSC	RLA	Qty	W	FLA
MSEX1BU-12HRFN8-QRE1GW	1	50	220-240 Min:198 Max:264	10.22	17.77	15	20	0.11	/	7.55	1	79	0.67

Notes:

MCA: Minimum Circuit Amperes (A)

MOP: Maximum rating over current protective device

MFA: Maximum Fuse Amperes (A)

MSC: Maximum Starting Current

RLA: Rated Load Amperes (A)

IFM: Indoor Fan Motor

OFM: Outdoor Fan Motor

FLA: Full Load Amperes (A)

2. Capacity Tables

2.1 Cooling

MSEX1BU-12HRFN8-QRE1GW+MOX430-12HFN8-QRE1GW																		
INDOOR AIRFLOW (CMH)	OUTDOOR DB(℃)	ID WB (℃)	16.0				18.0				19.0				22.0			
		ID DB (℃)	23.0	25.0	27.0	29.0	23.0	25.0	27.0	29.0	23.0	25.0	27.0	29.0	23.0	25.0	27.0	29.0
570	-15	TC	3.96	3.96	3.97	3.97	4.20	4.20	4.20	4.21	4.45	4.45	4.46	4.46	4.71	4.72	4.72	4.73
		S/T	0.63	0.74	0.84	0.96	0.60	0.70	0.80	0.91	0.56	0.66	0.75	0.86	0.53	0.62	0.71	0.81
		PI	0.41	0.41	0.41	0.41	0.43	0.43	0.43	0.43	0.46	0.46	0.46	0.46	0.48	0.48	0.48	0.48
	-10	TC	3.74	3.74	3.74	3.75	3.96	3.97	3.97	3.97	4.20	4.20	4.21	4.21	4.45	4.45	4.46	4.47
		S/T	0.62	0.73	0.83	0.94	0.59	0.69	0.78	0.89	0.55	0.65	0.74	0.84	0.52	0.61	0.69	0.79
		PI	0.39	0.39	0.39	0.39	0.41	0.42	0.42	0.42	0.44	0.44	0.44	0.44	0.47	0.47	0.47	0.47
	-5	TC	3.65	3.65	3.66	3.66	3.87	3.87	3.88	3.88	4.10	4.11	4.11	4.12	4.35	4.35	4.36	4.36
		S/T	0.61	0.72	0.81	0.93	0.58	0.68	0.77	0.88	0.54	0.64	0.72	0.83	0.51	0.60	0.68	0.78
		PI	0.37	0.37	0.37	0.37	0.40	0.40	0.40	0.40	0.42	0.42	0.42	0.42	0.44	0.45	0.45	0.45
	0	TC	3.63	3.64	3.64	3.65	3.85	3.85	3.86	3.86	4.08	4.09	4.09	4.10	4.33	4.33	4.34	4.34
		S/T	0.60	0.71	0.80	0.91	0.57	0.67	0.76	0.86	0.54	0.63	0.71	0.81	0.50	0.59	0.67	0.77
		PI	0.35	0.35	0.35	0.36	0.38	0.38	0.38	0.38	0.40	0.40	0.40	0.40	0.42	0.42	0.42	0.42
	5	TC	3.42	3.43	3.43	3.44	3.63	3.63	3.64	3.64	3.85	3.85	3.86	3.86	4.08	4.08	4.09	4.09
		S/T	0.61	0.72	0.82	0.93	0.58	0.68	0.77	0.88	0.54	0.64	0.73	0.83	0.51	0.60	0.69	0.78
		PI	0.32	0.32	0.32	0.32	0.34	0.34	0.34	0.34	0.36	0.36	0.36	0.37	0.39	0.39	0.39	0.39
	10	TC	3.21	3.21	3.22	3.22	3.40	3.41	3.41	3.41	3.61	3.61	3.61	3.62	3.82	3.83	3.83	3.84
		S/T	0.62	0.73	0.82	0.94	0.58	0.68	0.78	0.89	0.55	0.65	0.73	0.84	0.52	0.61	0.69	0.79
		PI	0.31	0.31	0.31	0.31	0.33	0.33	0.33	0.33	0.35	0.35	0.35	0.35	0.37	0.37	0.37	0.37
	15	TC	3.17	3.18	3.18	3.18	3.36	3.37	3.37	3.37	3.56	3.57	3.57	3.58	3.78	3.78	3.79	3.79
		S/T	0.60	0.70	0.80	0.91	0.56	0.66	0.75	0.86	0.53	0.62	0.71	0.81	0.50	0.59	0.67	0.76
		PI	0.34	0.34	0.34	0.34	0.36	0.36	0.36	0.36	0.38	0.38	0.38	0.39	0.41	0.41	0.41	0.41
	20	TC	3.13	3.14	3.14	3.14	3.32	3.33	3.33	3.33	3.52	3.52	3.53	3.53	3.73	3.74	3.74	3.75
		S/T	0.58	0.68	0.77	0.88	0.54	0.64	0.72	0.83	0.51	0.60	0.68	0.78	0.48	0.57	0.65	0.74
		PI	0.37	0.37	0.37	0.37	0.39	0.40	0.40	0.40	0.42	0.42	0.42	0.42	0.44	0.44	0.44	0.45
	25	TC	3.10	3.10	3.10	3.11	3.28	3.29	3.29	3.29	3.48	3.48	3.49	3.49	3.69	3.69	3.70	3.70
		S/T	0.55	0.65	0.74	0.84	0.52	0.61	0.70	0.80	0.49	0.58	0.66	0.75	0.47	0.55	0.62	0.71
		PI	0.40	0.40	0.40	0.41	0.43	0.43	0.43	0.43	0.45	0.45	0.45	0.46	0.48	0.48	0.48	0.48
	30	TC	3.13	3.13	3.14	3.14	3.32	3.32	3.32	3.33	3.51	3.52	3.52	3.53	3.73	3.73	3.73	3.74
		S/T	0.58	0.69	0.78	0.89	0.55	0.65	0.74	0.84	0.52	0.61	0.69	0.79	0.49	0.58	0.65	0.75
		PI	0.52	0.52	0.52	0.52	0.55	0.55	0.55	0.55	0.58	0.58	0.58	0.58	0.62	0.62	0.62	0.62
	35	TC	3.20	3.20	3.20	3.21	3.39	3.39	3.40	3.40	3.59	3.60	**3.60**	3.60	3.81	3.81	3.82	3.82
		S/T	0.64	0.75	0.85	0.97	0.60	0.71	0.81	0.92	0.57	0.67	**0.76**	0.87	0.54	0.63	0.72	0.82
		PI	0.67	0.68	0.68	0.68	0.72	0.72	0.72	0.72	0.76	0.76	**0.76**	0.76	0.80	0.80	0.81	0.81
	40	TC	2.77	2.77	2.78	2.78	2.94	2.94	2.94	2.95	3.11	3.12	3.12	3.13	3.30	3.31	3.31	3.31
		S/T	0.69	0.81	0.92	1.00	0.65	0.76	0.87	0.99	0.61	0.72	0.82	0.93	0.58	0.68	0.77	0.88
		PI	0.60	0.60	0.60	0.60	0.64	0.64	0.64	0.64	0.67	0.67	0.68	0.68	0.71	0.71	0.72	0.72
	45	TC	2.14	2.15	2.15	2.15	2.27	2.28	2.28	2.28	2.41	2.41	2.41	2.42	2.55	2.56	2.56	2.56
		S/T	0.73	0.86	0.98	1.00	0.69	0.81	0.92	1.00	0.65	0.77	0.87	0.99	0.62	0.72	0.82	0.94
		PI	0.49	0.49	0.49	0.49	0.52	0.52	0.52	0.52	0.55	0.55	0.55	0.56	0.59	0.59	0.59	0.59
	50	TC	1.21	1.21	1.21	1.22	1.28	1.29	1.29	1.29	1.36	1.36	1.36	1.37	1.44	1.45	1.45	1.45
		S/T	0.75	0.88	1.00	1.00	0.73	0.86	0.98	1.00	0.69	0.81	0.92	1.00	0.65	0.76	0.87	0.99
		PI	0.34	0.34	0.34	0.34	0.36	0.36	0.36	0.36	0.38	0.38	0.38	0.38	0.40	0.40	0.40	0.40

TC:Total Cooling Capacity (kW)

S/T:Sensible Cooling Capacity Ratio

PI:Power Input(kW)

Note: The table shows the case where the operation frequency of a compressor is fixed.

2.2 Heating

MSEX1BU-12HRFN8-QRE1GW+MOX430-12HFN8-QRE1GW									[SI_Unit]
INDOOR AIRFLOW (CMH)	HEATING PERFORMANCE AT INDOOR DRY BULB TEMPERATURE								
	OUTDOOR DB(°C)	TC:TOTAL CAPACITY IN KILOWATTS (KW)				PI:TOTAL POWER IN KILOWATTS (KW)			
		Indoor Conditions (DB °C)				Indoor Conditions (DB °C)			
		16.0	20.0	22.0	24.0	16.0	20.0	22.0	24.0
570	-35.0	3.52	3.50	3.48	3.46	1.54	1.60	1.52	1.51
	-30.0	3.88	3.86	3.84	3.82	1.73	1.80	1.70	1.69
	-25.0	4.25	4.23	4.21	4.18	1.91	1.99	1.89	1.88
	-20.0	4.62	4.60	4.57	4.55	2.10	2.19	2.07	2.06
	-15.0	5.00	4.97	4.95	4.92	2.30	2.40	2.26	2.26
	-10.0	5.34	5.31	5.28	5.25	2.45	2.56	2.42	2.41
	-7.0	5.59	5.56	5.53	5.50	2.61	2.72	2.57	2.56
	-5.6	5.30	5.27	5.25	5.22	2.46	2.43	2.41	2.39
	-2.8	4.98	4.96	4.93	4.93	2.18	2.13	2.11	2.08
	0.0	4.64	4.61	4.58	4.55	1.89	1.83	1.80	1.77
	2.8	4.43	4.38	4.35	4.32	1.63	1.55	1.52	1.48
	5.6	4.32	4.29	4.26	4.23	1.35	1.27	1.22	1.18
	7.0	4.23	4.20	4.29	4.26	1.21	0.95	1.07	1.02
	11.1	4.06	4.00	3.97	3.94	0.80	0.68	0.63	0.57
	13.9	3.82	3.77	3.74	3.71	0.52	0.40	0.34	0.28
	16.7	3.59	3.53	3.50	3.48	0.25	0.11	0.04	-0.03
	18.0	3.50	3.42	3.39	3.36	0.11	-0.03	-0.10	-0.18

Note: The table shows the case where the operation frequency of a compressor is fixed.

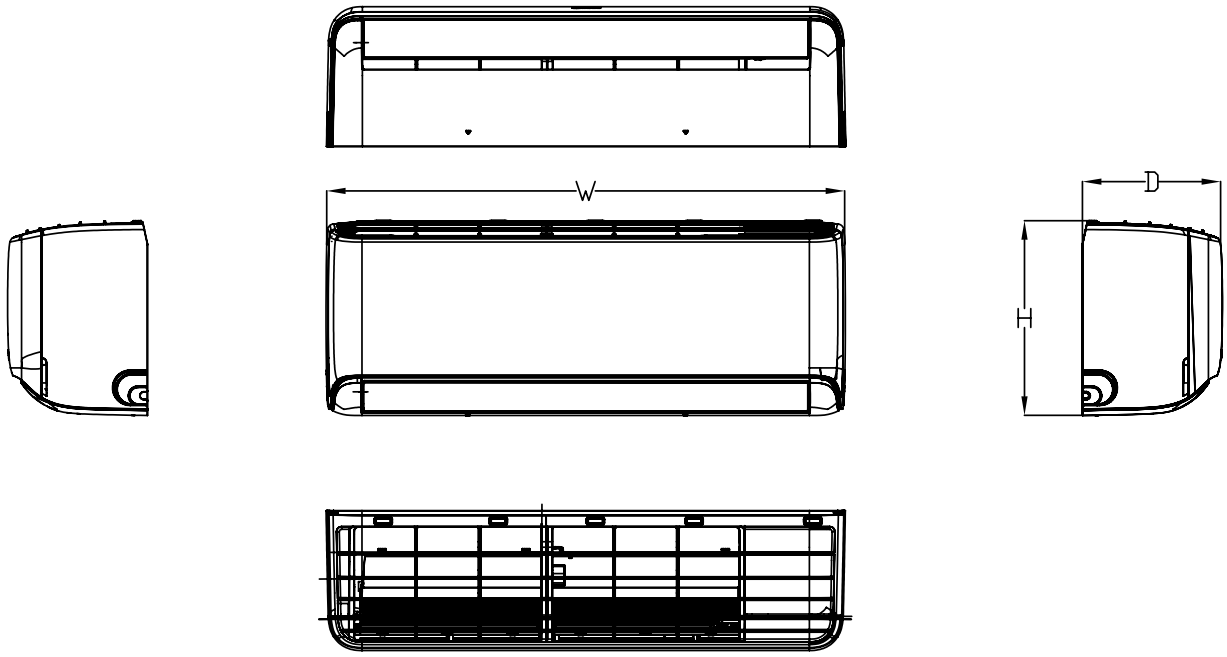
3. Capacity Correction Factor for Height Difference

Capacity(Btu/h)	12k		Pipe Length (m)			
Indoor Upper than Outdoor			5	10	20	25
Height difference H (m)	Cooling	10		0.973	0.948	0.936
		5	0.995	0.983	0.958	0.945
		0	1.000	0.988	0.963	0.950
	Heating	10		0.993	0.978	0.970
		5	1.000	0.993	0.978	0.970
		0	1.000	0.993	0.978	0.970
Outdoor Upper than Indoor			5	10	20	25
Height difference H (m)	Cooling	0	1.000	0.988	0.963	0.950
		5	1.000	0.988	0.963	0.950
		10		0.988	0.963	0.950
	Heating	0	1.000	0.993	0.978	0.970
		5	0.992	0.985	0.970	0.962
		10		0.977	0.962	0.955

4. Dimensional Drawings & Centre of gravity

4.1 Dimensional Drawings

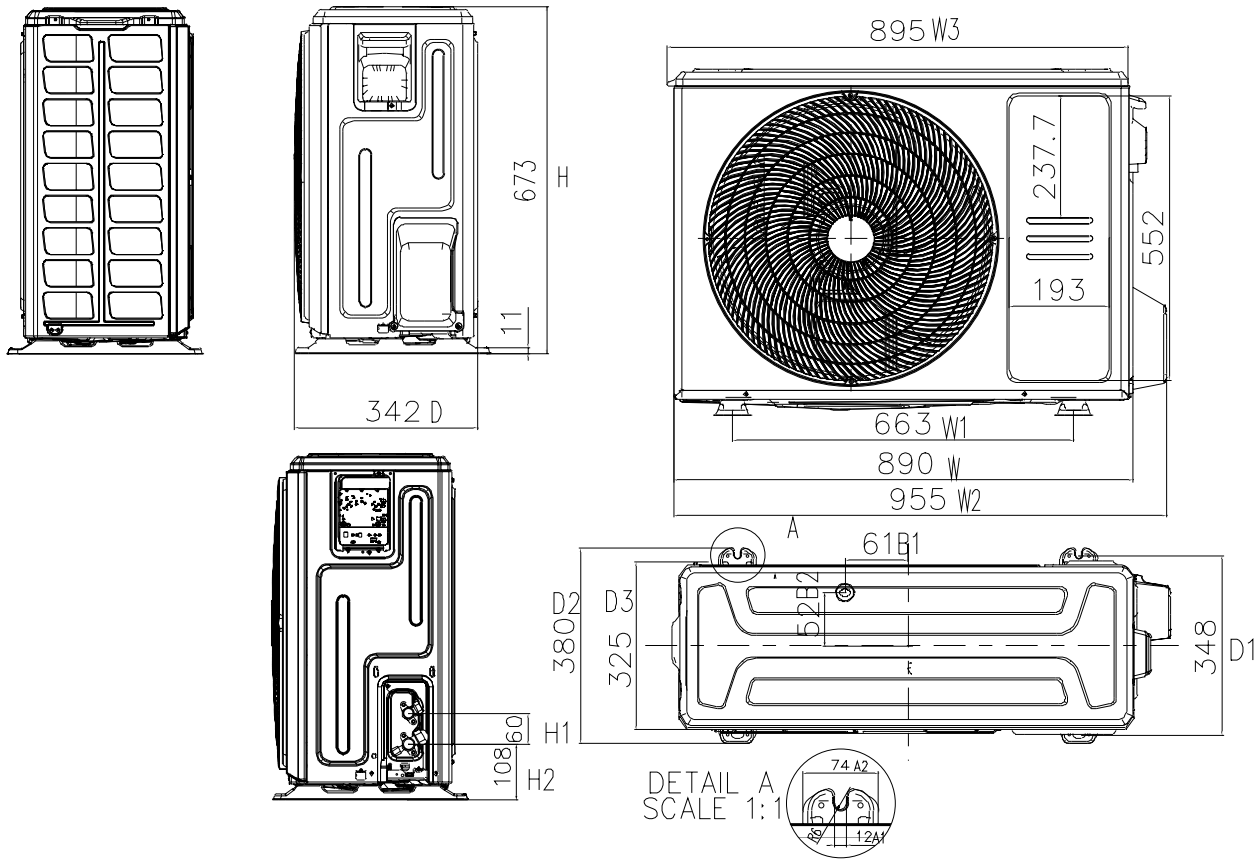
4.1.1 Indoor Unit



Model	Unit	W	D	H
MSEX1BU-12HRFN8-QRE1GW	mm	822	194	309
	inch	32.36	7.64	12.17

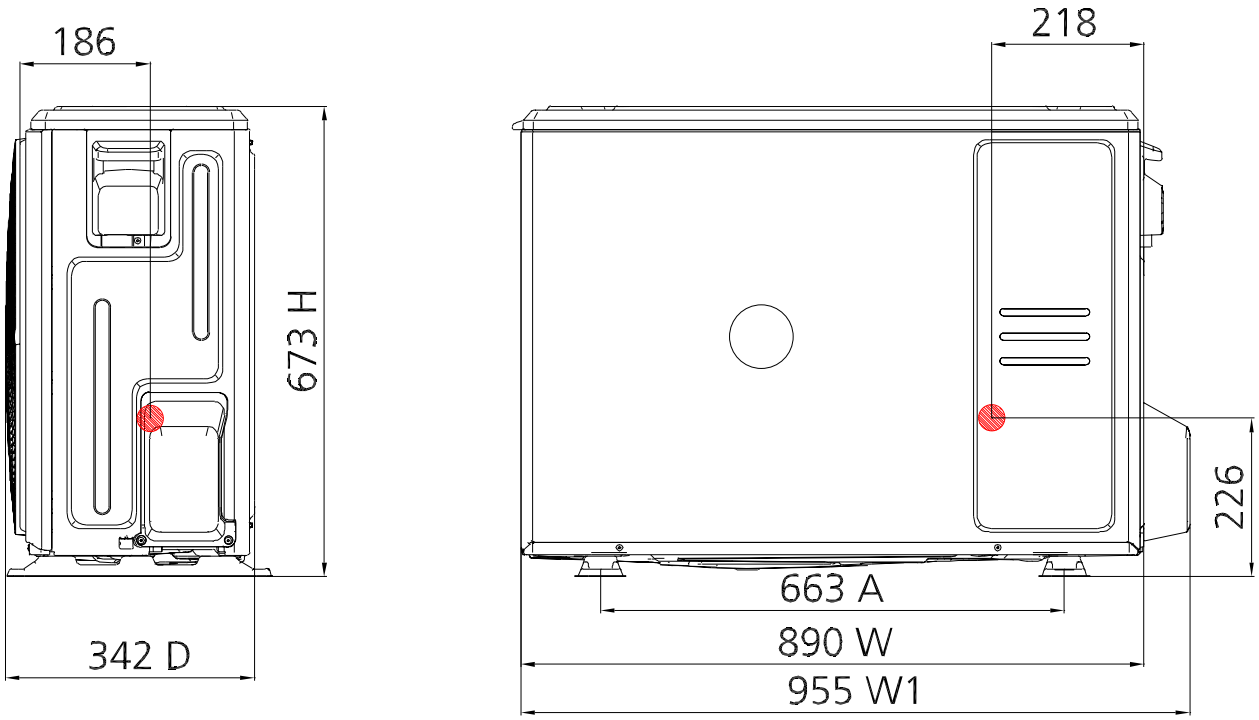
4.1.2 Outdoor Unit

MOX430-12HFN8-QRE1GW



4.2 Centre of gravity

MOX430-12HFN8-QRE1GW

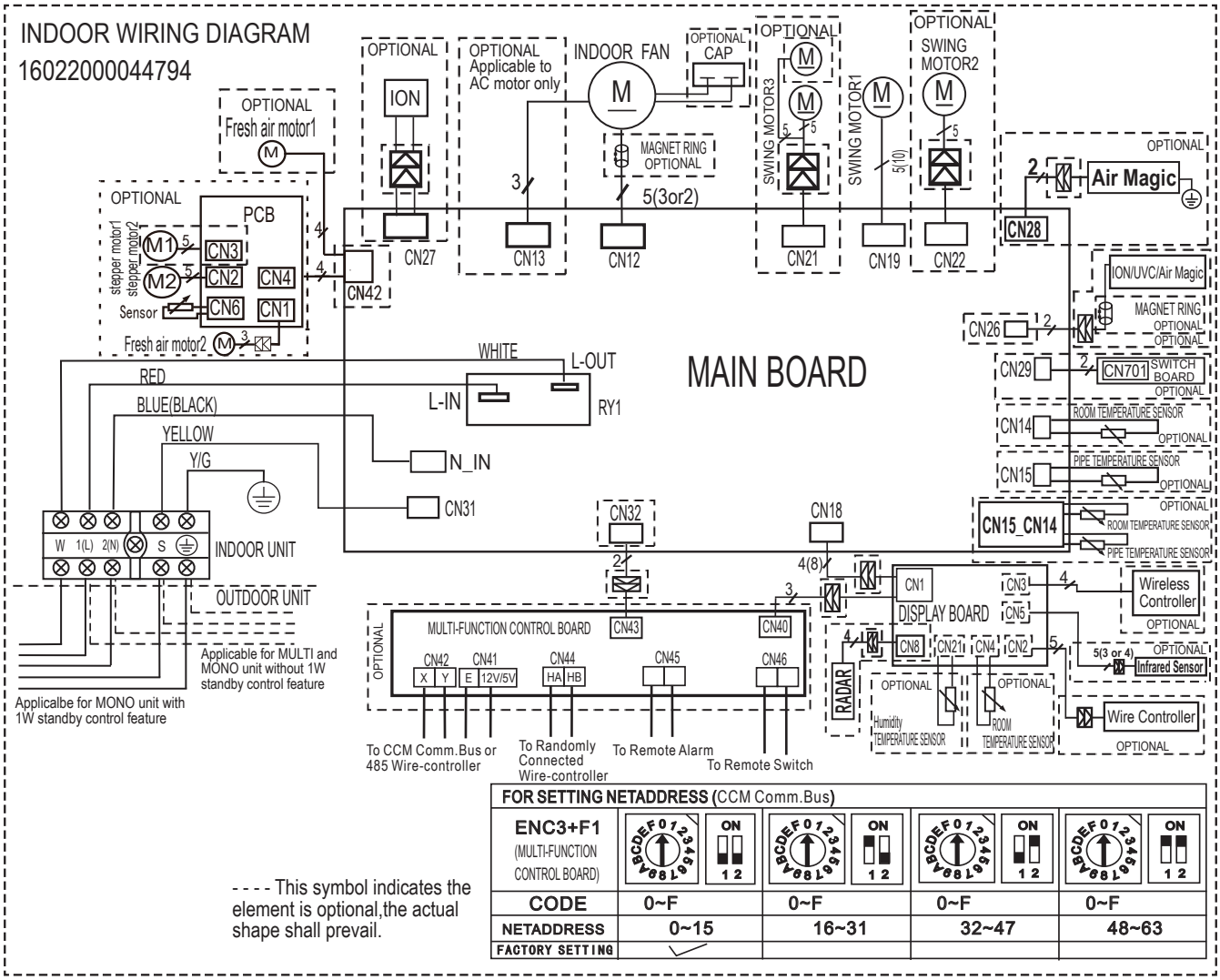


5. Electrical Wiring Diagrams

5.1 Indoor unit

Abbreviation	Paraphrase
Y/G	Yellow-Green Conductor
ION	Positive and Negative Ion Generator
CAP	Capacitor
PLASMA	Electronic Dust Collector
L	LIVE
N	NEUTRAL

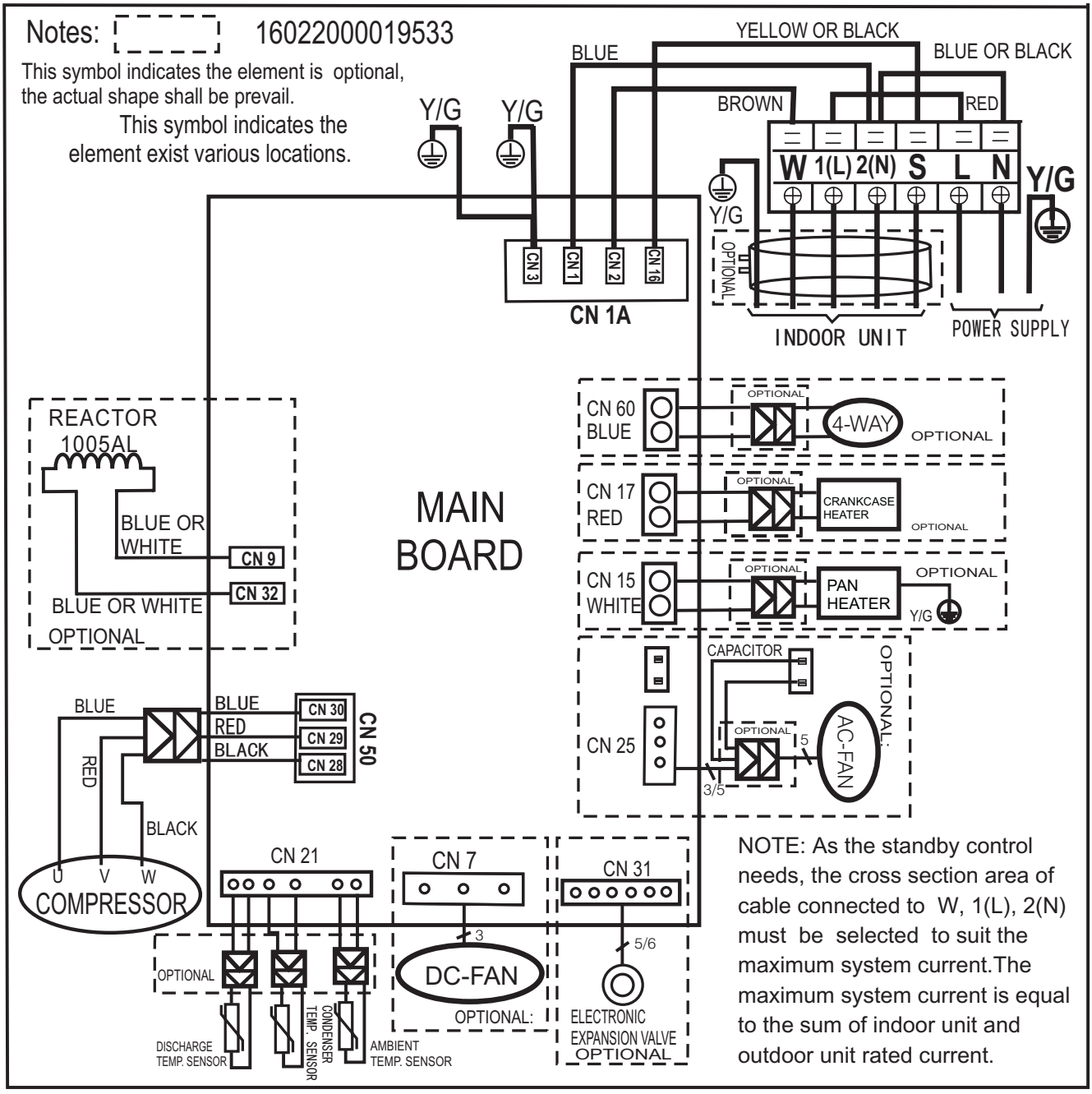
MSEX1BU-12HRFN8-QRE1GW



5.2 Outdoor Unit

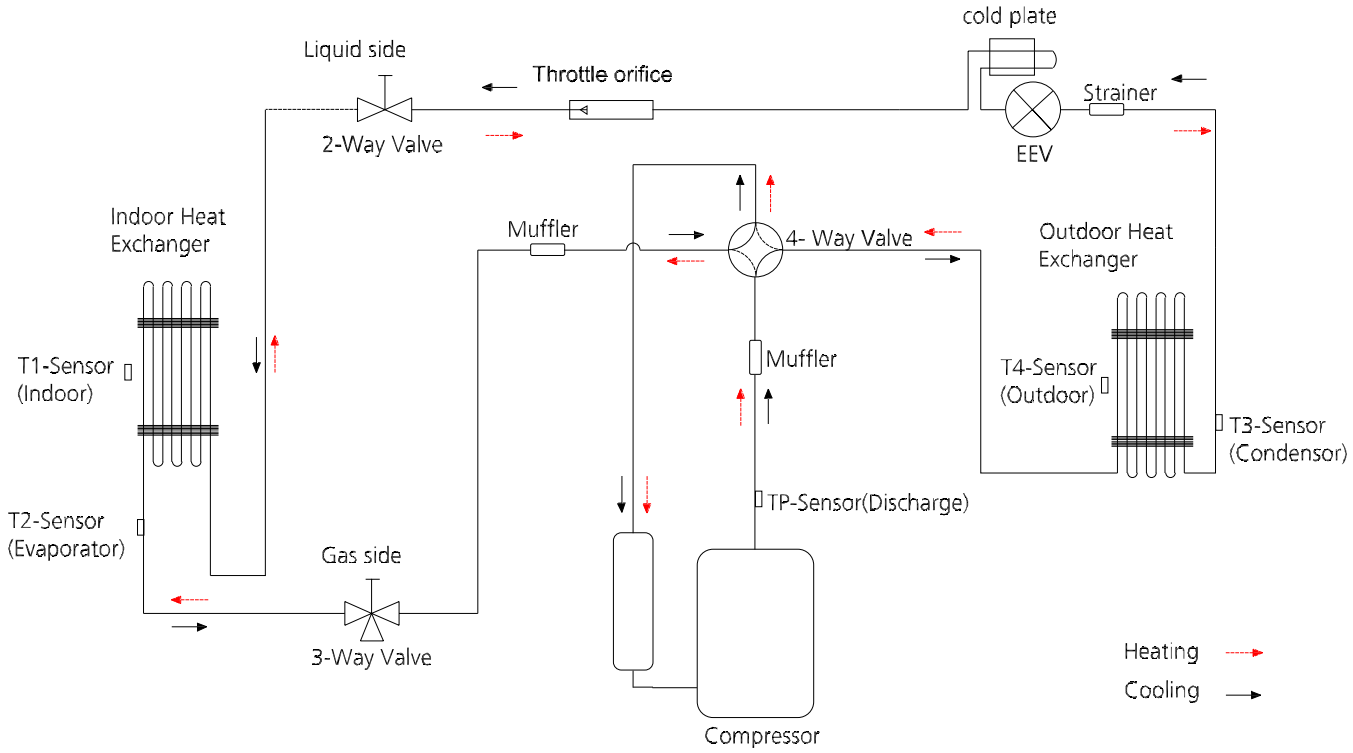
Abbreviation	Paraphrase
4-WAY	Gas Valve Assembly/4-WAY VALVE
AC-FAN	Alternating Current FAN
DC-FAN	Direct Current FAN
COMP	Compressor

MOX430-12HFN8-QRE1GW



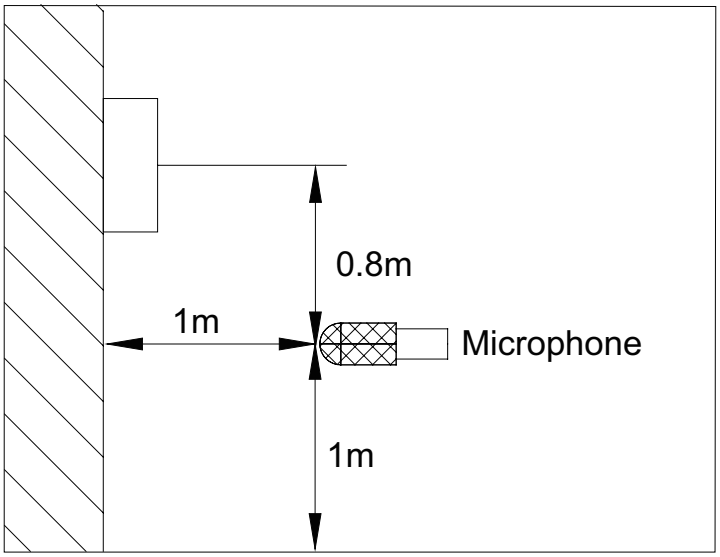
6. Refrigerant Cycle Diagrams

MSEX1BU-12HRFN8-QRE1GW



7. Noise Criterion Curves

7.1 Indoor Unit



Notes:

-Sound measured at 1.0m away from the center of the unit.

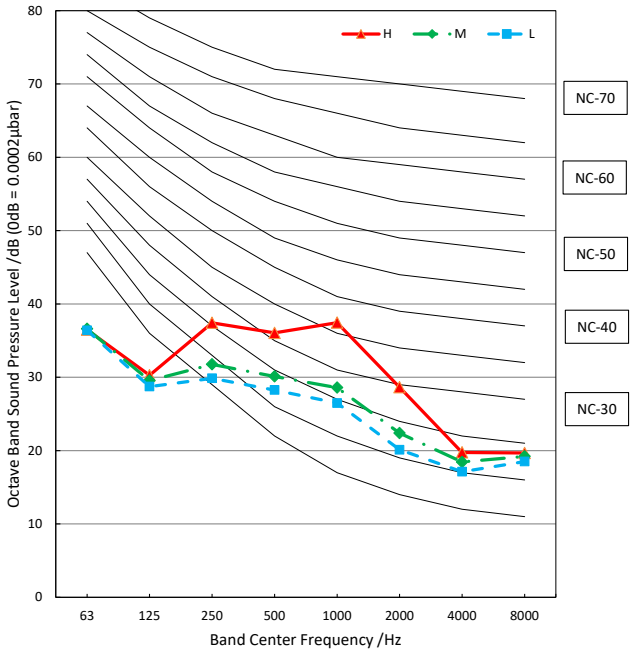
-Data is valid at nominal operation condition

-Reference acoustic pressure OdB = 20μPa

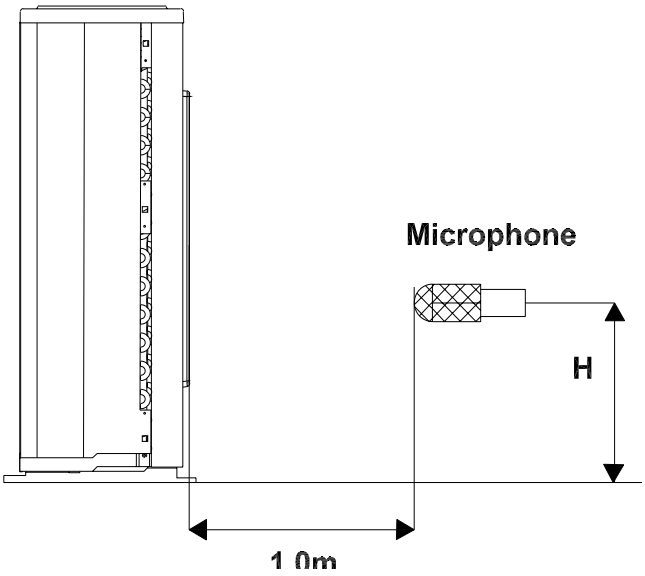
-Sound level will vary depending on a range of factors such as the construction -(acoustic absorption coefficient) of particular room in which the equipment is installed.

-The operating conditions are assumed to be standard.

MSEX1BU-12HRFN8-QRE1GW



7.2 Outdoor Unit



Note: H= 0.5 × height of outdoor unit

Notes:

-Sound measured at 1.0m away from the center of the unit.

-Data is valid at free field condition

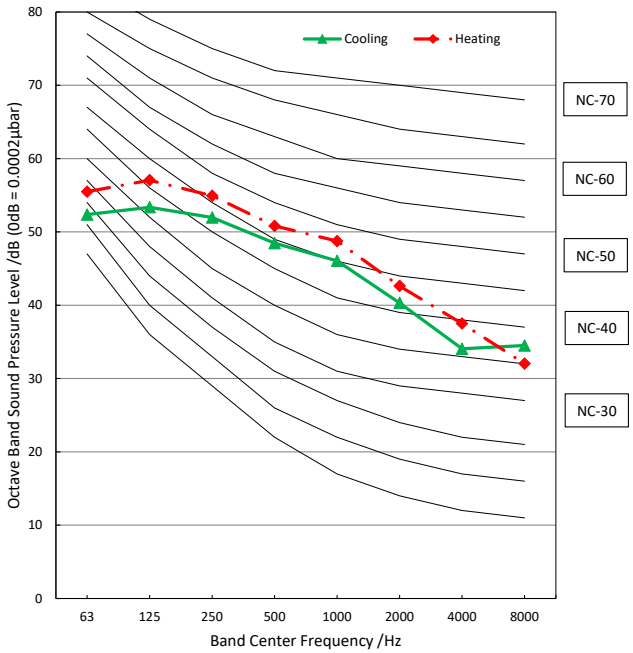
-Data is valid at nominal operation condition

-Reference acoustic pressure OdB=20μPa

-Sound level will vary depending on arrange off actors such as the construction (acoustic absorption coefficient) of particular room in which the equipment is installed.

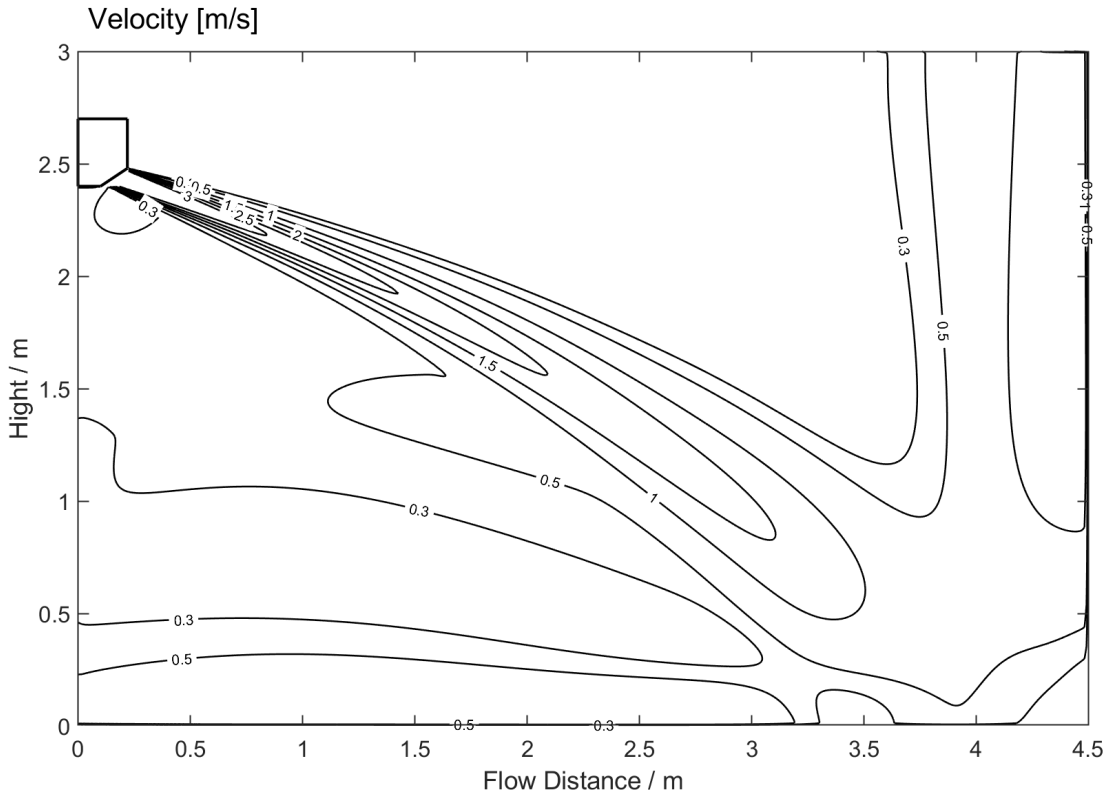
-The operating conditions are assumed to be standard.

MOX430-12HFN8-QRE1GW

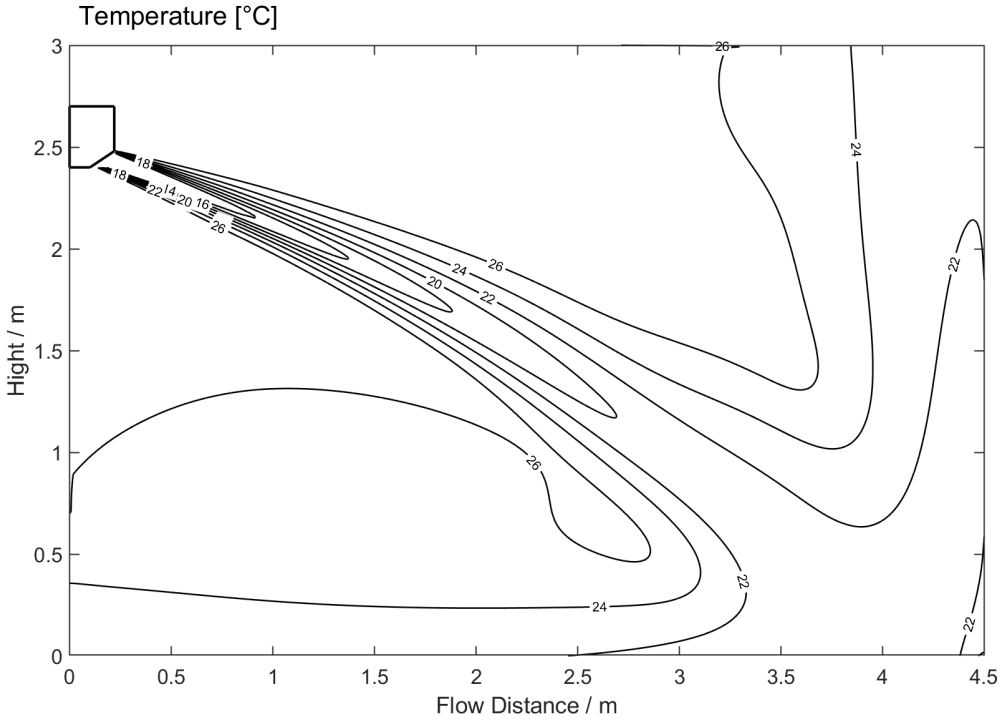


8. Air Velocity and Temperature Distributions

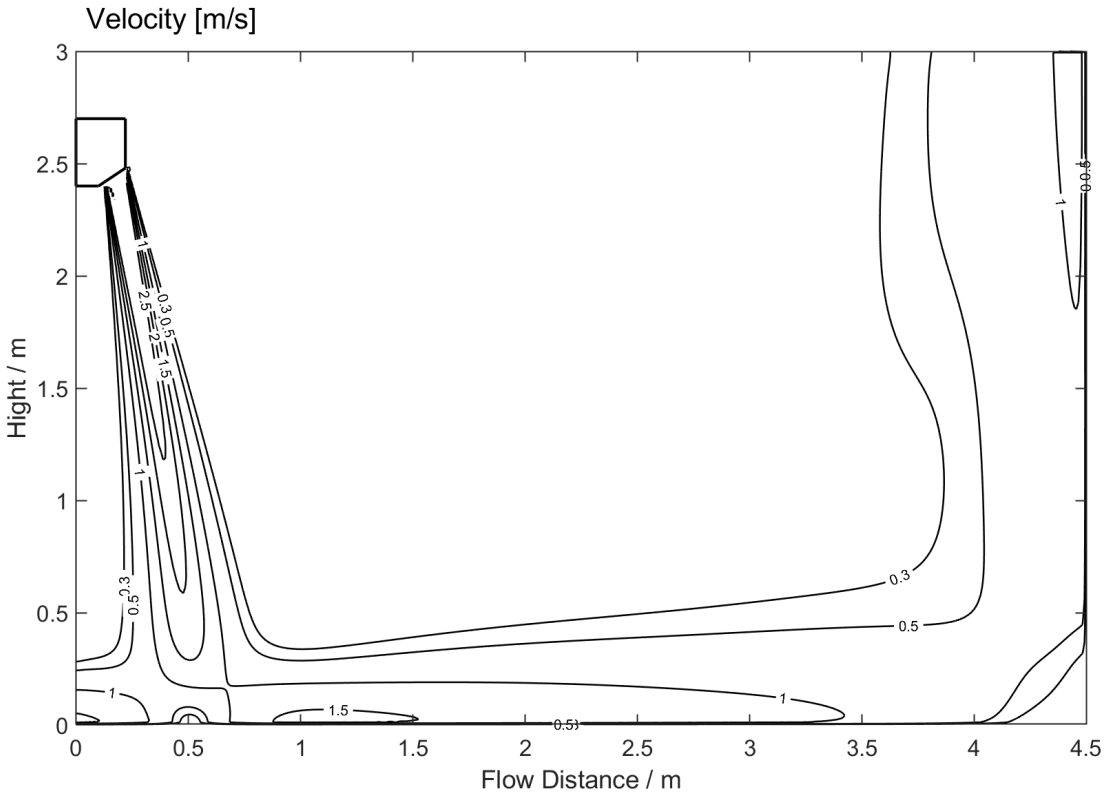
12k-Cooling(ID: 27°C/80.6°F, OD: 35°C/95°F)
Discharge Angle 20°
Airflow velocity distributions



Temperature distributions



12k-Heating(ID: 20°C/68°F, OD: 7°C/44.6°F)
Discharge Angle 78°
Airflow velocity distributions



Temperature distributions