LIGHT COMMERCIAL R32

DUCT-SL 2 53M
OUTDOOR UNIT-SL 2 53M

TECHNICAL MANUAL

TM19B006GB-00

07/02/2019

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Specifications

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1. Model Reference

Refer to the following table to determine the specific indoor and outdoor unit model number of your purchased equipment.

Indoor Unit Model	Outdoor Unit Model	Capacity (Btu/h)	Power Supply
ID2-XY 53M	MC2-Y 53M	18K	1Φ, 220-240V~, 50Hz

2. General Specifications

Indoor model			ID2-XY 53M
Outdoor model			MC2-Y 53M
Power supply (Indoor)		V- Ph-Hz	220~240-1-50
Power Supply (Outdoor)		V-Ph-Hz	220~240-1-50
Max. input consumption		W	2950
Max. current		A	13.5
Indoor fan motor	Model		ZKFN-160-8-1-2
	Qty		1
	Insulation class		E
	IP rating		IPX0
	Input	W	90.0
	Capacitor	uF	/
	Speed(Hi/Mi/Lo)	r/min	1650/1300/1000
Indoor coil	Number of rows		3
	Tube pitch(a)x row pitch(b)	mm	21x13.37
	Fin spacing	mm	1.4
	Fin type (code)		Hydrophilic aluminum
	Tube outside dia.and type	mm	Φ7,Inner groove tube
	Coil length x height x width	mm	695x252x40.11
	Number of circuits		4
Indoor air flow (Hi/Mi/Lo)		m3/h	880/650/350
ESP	Rated	Pa	25
	Range	Pa	0-100
Indoor sound pressure level		dB(A)	41.5/38/33
Indoor sound power level		dB(A)	60
Indoor unit	Dimension(W*D*H)	mm	880x674x210
	Packing (W*D*H)	mm	1070x725x280
	Net/Gross weight	Kg	24.3/29.6
Design pressure		MPa	4.2/1.5
Drainage water pipe diameter		mm	ODΦ25mm
Refrigerant piping	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ12.7(1/4"/1/2")
Controller			Wired control
Operation temperature		℃	17-30
Room temperature	Cooling	℃	17~32
	Heating	℃	0~30
Qty'per 20' /40' /40'HQ		Indoor unit	120/264/297
Compressor	Model		KSN140D21UFZ
	Type		ROTARY
	Brand		GMCC
	Capacity	W	4385
	Input	W	1140
	Rated current(RLA)	A	7.5
	Refrigerant oil/oil charge	ml	VG74 440
Outdoor fan motor	Model		ZKFN-34-8-1-3
	Qty		1
	Insulation class		E
	IP rating		IPX4
	Output	W	34
	Capacitor	uF	/
	Speed	r/min	850

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,Inner groove tube
	Coil length x height x width	mm	860x504x44
	Number of circuits		2
Outdoor air flow		m3/h	2000
Outdoor sound pressure level		dB(A)	54.5
Outdoor sound power level		dB(A)	63
Throttle type			EXV
Outdoor unit	Dimension(W*D*H)	mm	800x333x554
	Packing (W*D*H)	mm	920x390x615
	Net/Gross weight	Kg	34.5/37.2
Refrigerant type	Type	-	R32
	GWP	-	675
	Charged quantity	Kg	1.35
Design pressure		MPa	4.2/1.5
Refrigerant piping	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ9.52(1/4"/3/8")
	Max. refrigerant pipe length	m	30
	Max. difference in level	m	20
Ambient temperature	Cooling	℃	-15~50
	Heating	℃	-15~24
Qty'per 20' /40' /40'HQ		Outdoor unit	108/219/292

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.

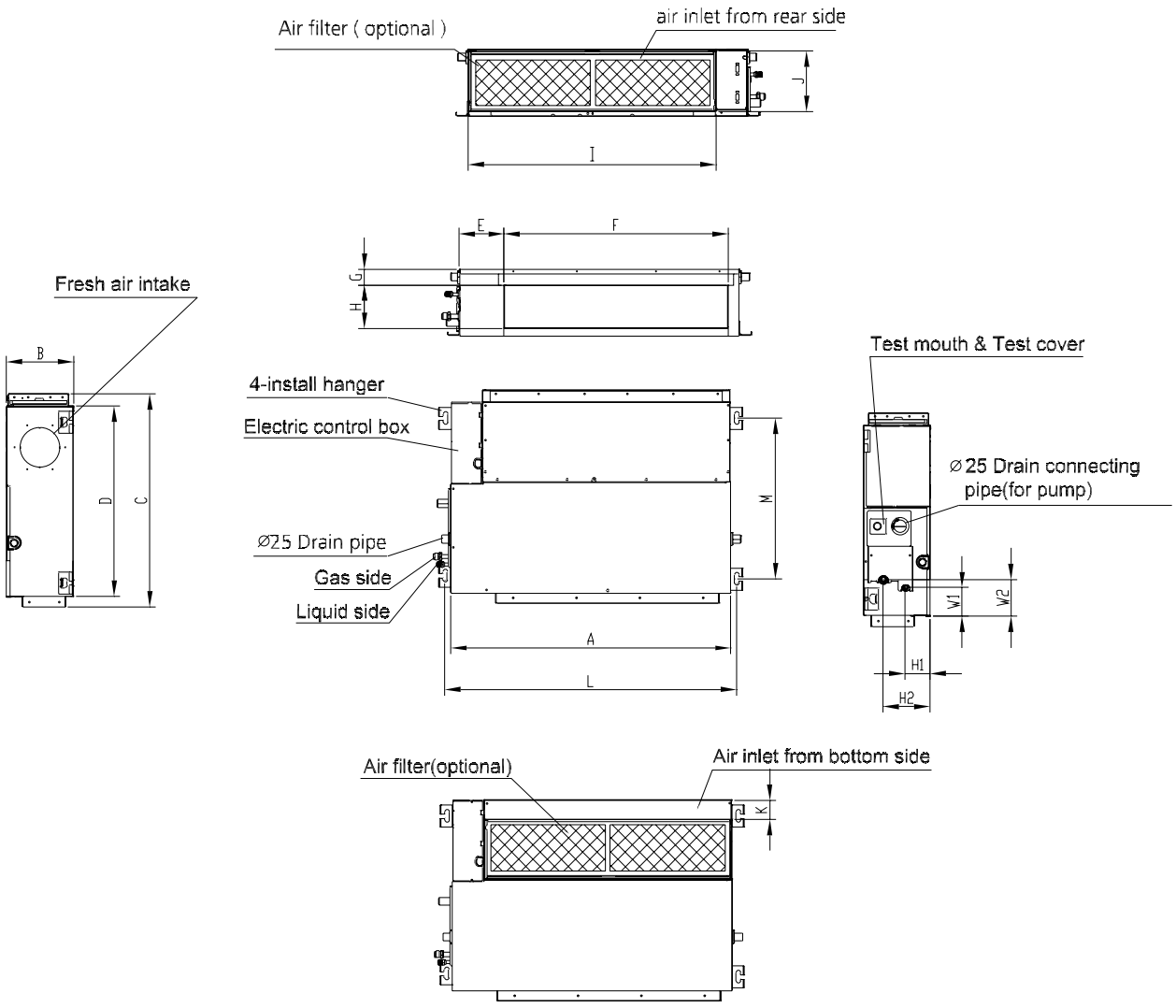
Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
- Interconnecting Piping Length 5 m
- Level Difference of Zero.

2) Capacities are Net Capacities.

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

3. Dimensional Drawings

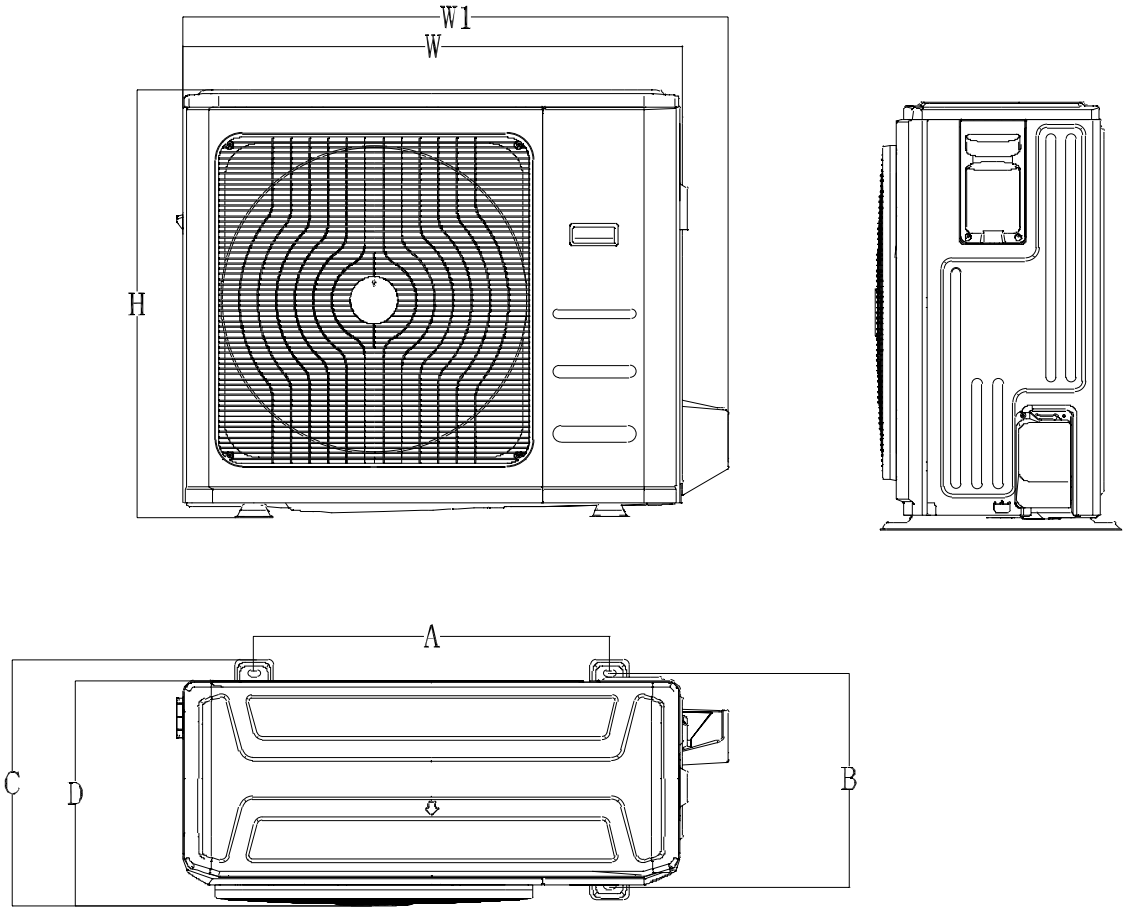
3.1 Indoor Unit



Model	unit	A	B	C	D	E	F	G	H	I	J	K	L	M	H1	H2	W1	W2
I D 2 - X Y 53M	mm	880	210	674	600	140	706	50	136	782	190	40	920	508	78	148	88	112
	inch	34.65	8.27	26.54	23.62	5.51	27.8	1.97	5.35	30.79	7.48	1.57	36.22	20	3.07	5.83	3.46	4.41

3.2 Outdoor Unit

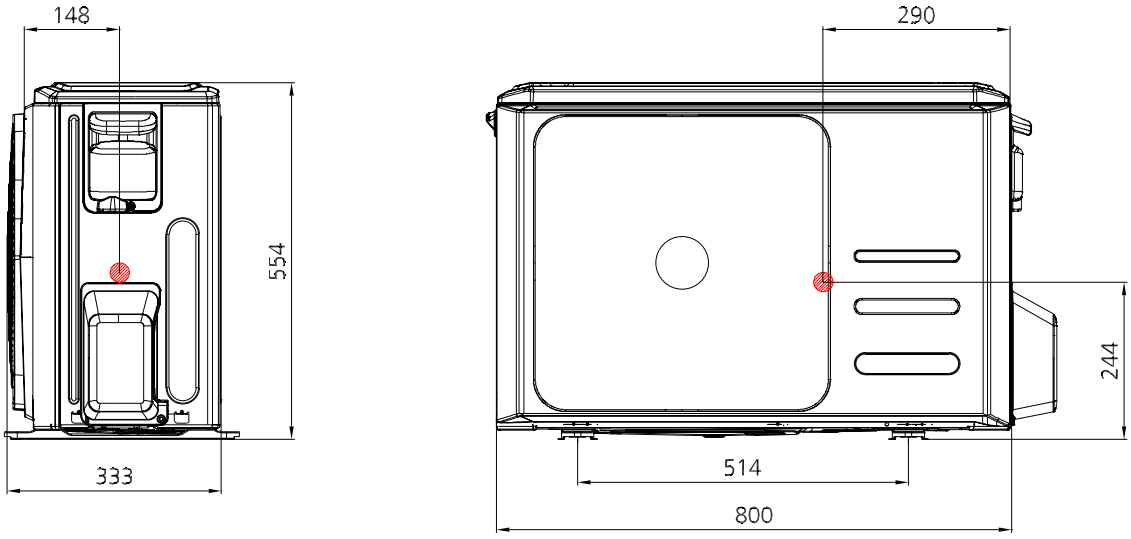
Single Fan Outdoor Unit



Model	unit	W	D	H	W1	A	B
MC2-Y 53M	mm	800	333	554	870	514	340
	inch	31.49	13.11	21.81	34.25	20.23	13.39

4. Centre of gravity

MC2-Y 53M

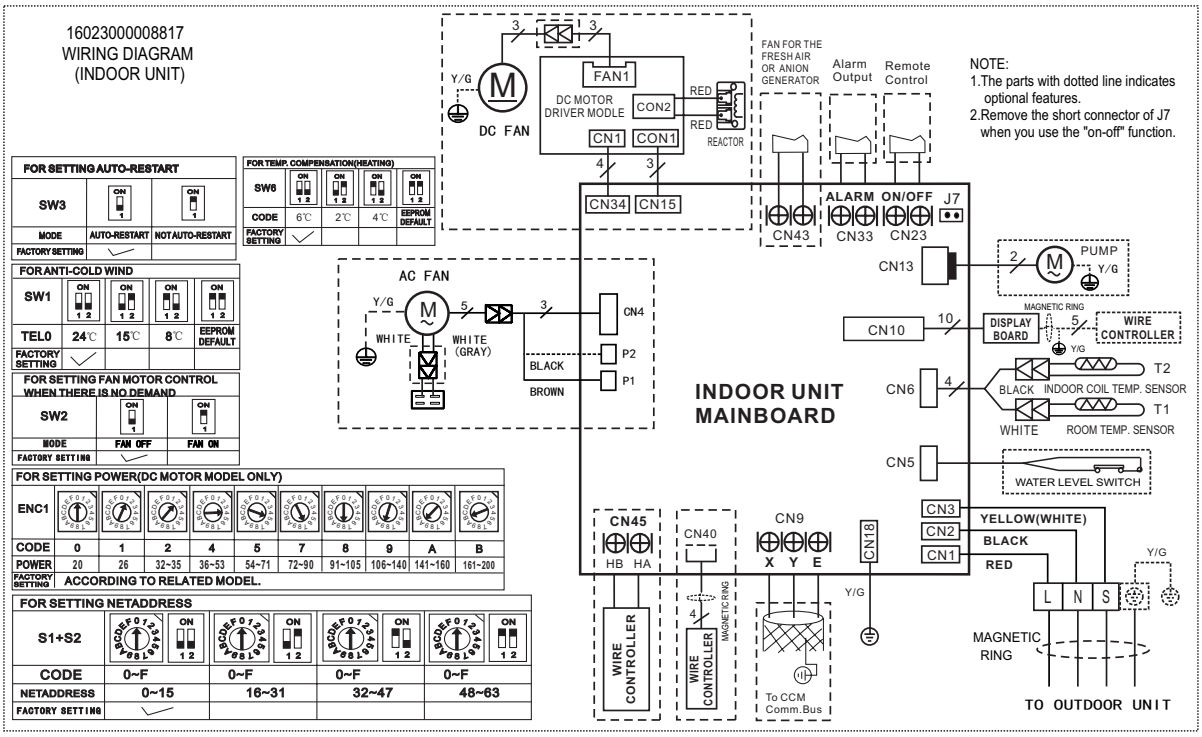


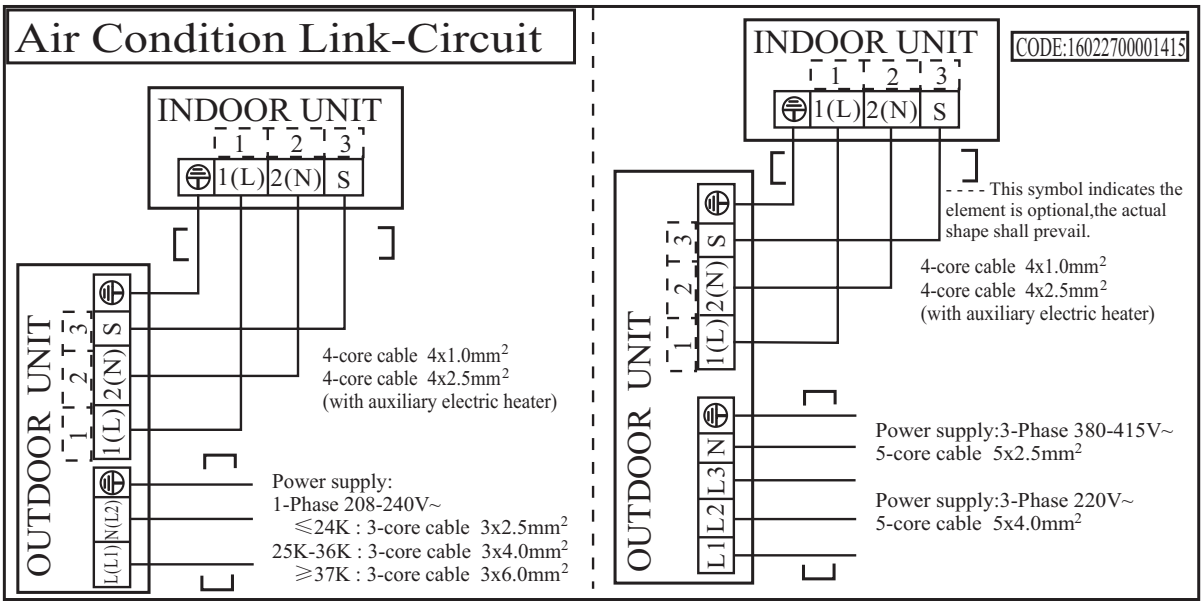
5. Electrical Wiring Diagrams

5.1 Indoor unit

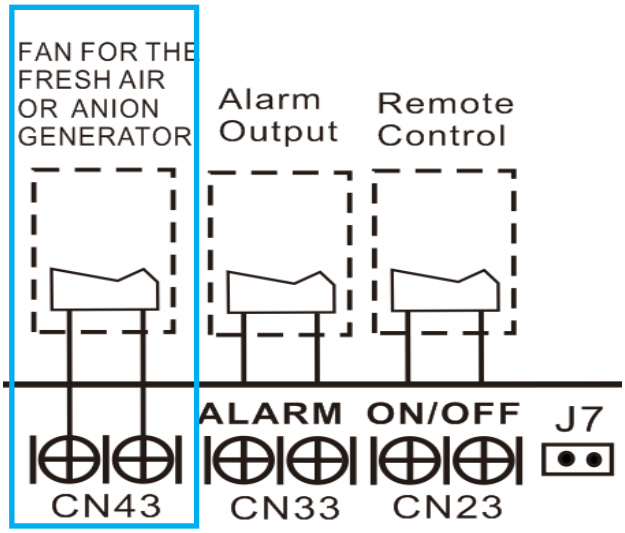
Abbreviation	Paraphrase
Y/G	Yellow-Green Conductor
CAP1	Indoor Fan Capacitor
FAN	Indoor Fan
PUMP	PUMP
L	LIVE
N	NEUTRAL
TO CCM Comm.Bus	Central Controller
T1	Indoor Room Temperature
T2	Coil Temperature of Indoor Heat Exchanger
P1	Super High Speed
P2	High Speed

ID2-XY 53M

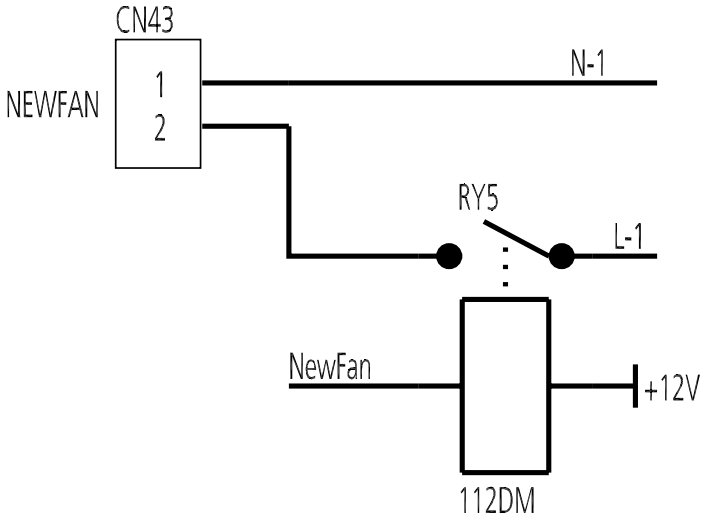

16023000008817
WIRING DIAGRAM
(INDOOR UNIT)
FOR SETTING AUTO-RESTART
SW3
MODE
AUTO-RESTART
NOT AUTO-RESTART
FACTORY SETTING
FOR TEMP. COMPENSATION(HEATING)
SW6
CODE
6℃
2℃
4℃
EEPROM DEFAULT
FACTORY SETTING
FOR ANTI-COLD WIND
SW1
TEL0
24℃
15℃
8℃
EEPROM DEFAULT
FACTORY SETTING
FOR SETTING FAN MOTOR CONTROL WHEN THERE IS NO DEMAND
SW2
MODE
FAN OFF
FAN ON
FACTORY SETTING
FOR SETTING POWER(DC MOTOR MODEL ONLY)
ENC1
CODE 0 1 2 4 5 7 8 9 A B
POWER 20 26 32~35 36~53 54~71 72~90 91~105 106~140 141~160 161~200
FACTORY SETTING ACCORDING TO RELATED MODEL.
FOR SETTING NETADDRESS
S1+S2
CODE 0~F 0~F 0~F 0~F
NETADDRESS 0~15 16~31 32~47 48~63
FACTORY SETTING
DC FAN
DC MOTOR DRIVER MODLE
FAN1
CON2
CN1
CON1
REACTOR
RED
FAN FOR THE FRESH AIR OR ANION GENERATOR
Alarm Output
Remote Control
NOTE:
1.The parts with dotted line indicates optional features.
2.Remove the short connector of J7 when you use the "on-off" function.
CN34
CN15
CN43
ALARM ON/OFF
CN33
CN23
J7
AC FAN
WHITE
WHITE (GRAY)
BLACK
BROWN
CN4
P2
P1
INDOOR UNIT MAINBOARD
CN13
PUMP
CN10
DISPLAY BOARD
MAGNETIC RING
WIRE CONTROLLER
CN6
T2
T1
BLACK
INDOOR COIL TEMP. SENSOR
WHITE
ROOM TEMP. SENSOR
CN5
WATER LEVEL SWITCH
CN45
HB HA
CN40
CN9
X Y E
CN18
CN3
CN2
CN1
YELLOW(WHITE)
BLACK
RED
L N S
MAGNETIC RING
TO OUTDOOR UNIT
To CCM Comm.Bus

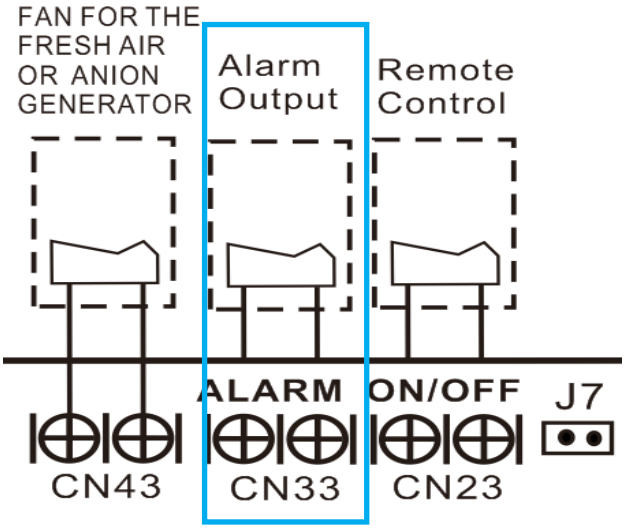

Air Condition Link-Circuit
INDOOR UNIT
1(L) 2(N) S
OUTDOOR UNIT
L(L1) N(L2)
4-core cable 4x1.0mm²
4-core cable 4x2.5mm²
(with auxiliary electric heater)
Power supply:
1-Phase 208-240V~
≤24K : 3-core cable 3x2.5mm²
25K-36K : 3-core cable 3x4.0mm²
≥37K : 3-core cable 3x6.0mm²
CODE:16022700001415
- - - - This symbol indicates the element is optional,the actual shape shall prevail.
4-core cable 4x1.0mm²
4-core cable 4x2.5mm²
(with auxiliary electric heater)
Power supply:3-Phase 380-415V~
5-core cable 5x2.5mm²
Power supply:3-Phase 220V~
5-core cable 5x4.0mm²
L1 L2 L3 N

5.2 Some connectors introduce:



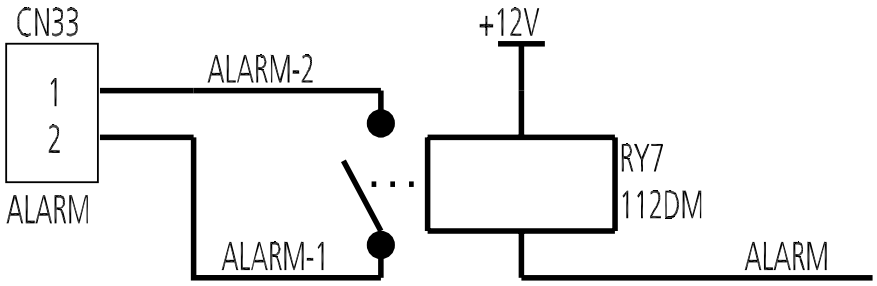
A. For new fresh motor terminal port (also for Anion generator) CN43:
1. Connect the fan motor to the port , no need care L/N of the motor ;
2. The output voltage is the power supply;
3. The fresh motor can not excess 200W or 1A , follow the smaller one ;
4. The new fresh motor will be worked when the indoor fan motor work ;when the indoor fan motor stops , the new fresh motor would be stopped ;
5. When the unit enter force cooling mode or capacity testing mode , the fresh motor isn't work .

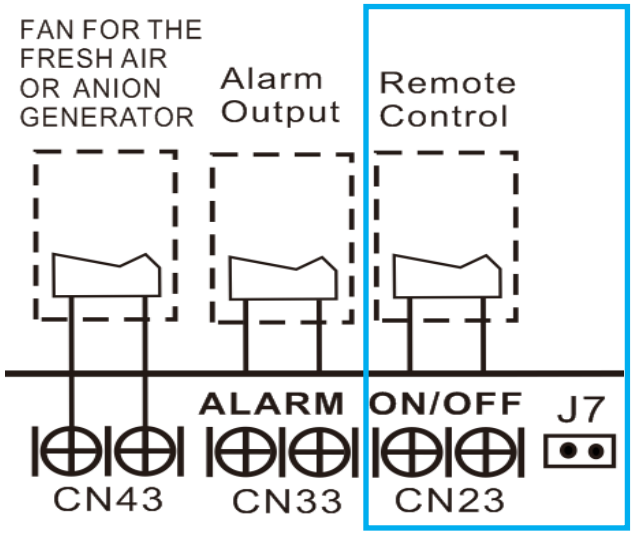




B For ALARM terminal port CN33

1. Provide the terminal port to connect ALARM ,but no voltage of the terminal port , the power from the ALARM system (not from the unit)
2. Although design voltage can support higher voltage ,but we strongly ask you connect the power less than 24V, current less than 0.5A
3. When the unit occurs the problem , the relay would be closed , then ALARM works



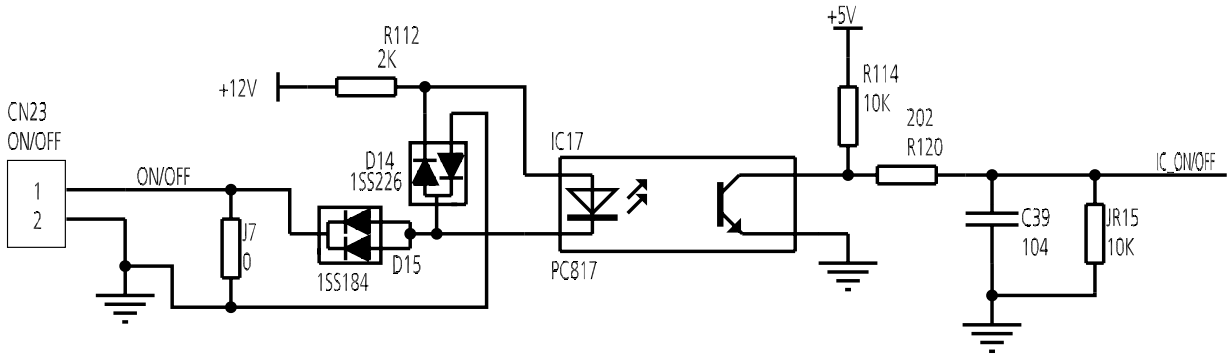


C. For remote control (ON-OFF) terminal port CN23 and short connector of J7

1. Remove the short connector of J7 when you use ON-OFF function;
2. When remote switch off (OPEN) ;the unit would be off;
3. When remote switch on (CLOSE) ;the unit would be on;
4. When close/open the remote switch, the unit would be responded the demand within 2 seconds;
5. When the remote switch on . you can use remote controller/ wire controller to select the mode what you want ;when the remote switch off , the unit would not respond the demand from remote controller/wire controller.

when the remote switch off , but the remote controller / wire controller are on, CP code would be shown on the display board.

6.The voltage of the port is 12V DC , design Max.current is 5mA.

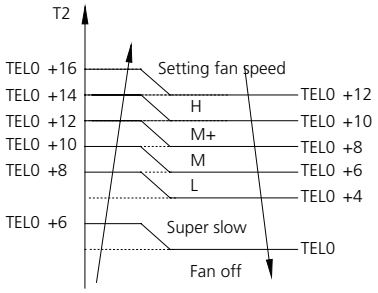


5.3 Micro-Switch Introduce:

FOR ANTI-COLD WIND				
SW1	ON 1 2	ON 1 2	ON 1 2	ON 1 2
TEL0	24℃	15℃	8℃	EEPROM DEFAULT
FACTORY SETTING	✓			

A. Micro-switch SW1 is for selection of indoor fan stop temperature (TEL0) when it is in anti-cold wind action in heating mode.

Range: 24°C, 15°C, 8°C, according to EEROM setting (reserved for special customizing).



FOR SETTING FAN MOTOR CONTROL WHEN THERE IS NO DEMAND		
SW2	ON 1	ON 1
MODE	FAN OFF	FAN ON
FACTORY SETTING	✓	

B. Micro-switch SW2 is for selection of indoor FAN ACTION if room temperature reaches the set point and the compressor stops.

Range: OFF (in 127s), Keep running.

FOR SETTING AUTO-RESTART		
SW3	ON 1	ON 1
MODE	AUTO-RESTART	NOT AUTO-RESTART
FACTORY SETTING	✓	

C. Micro-switch SW3 is for selection of auto-restart function.

Range: Active, inactive

FOR MAIN-SLAVE SETTING				
SW5	ON 1 2	ON 1 2	ON 1 2	ON 1 2
MODE	MAIN NO SLAVE	MAIN	MAIN	SLAVE
FACTORY SETTING	✓			

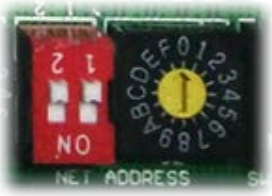
D. Micro-switch SW5 is for setting the master or slave unit when the unit is in twin connection.

Range: Master no slave (Normal 1 drive 1 connection), Master (2 positions without difference), Slave

FOR TEMP. COMPENSATION(HEATING)				
SW6	ON 1 2	ON 1 2	ON 1 2	ON 1 2
CODE	6℃	2℃	4℃	EEPROM DEFAULT
FACTORY SETTING	✓			

E.Micro-switch SW6 is for selection of temperature compensation in heating mode. This helps to reduce the real temperature difference between ceiling and floor so that the unit could run properly. If the height of installation is lower, smaller value could be chosen.

Range: 6°C, 4°C, 2°C, E function (reserved for special customizing)



FOR SETTING NETADDRESS				
S1+S2	ON 1 2	ON 1 2	ON 1 2	ON 1 2
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	✓			

F. Micro-switch S1 and dial-switch S2 are for address setting when you want to control this unit by a central controller.

Range: 00-63

FOR SETTING POWER(FACTORY USE ONLY)							
ENC1							
CODE	4	5	7	8	9	A	B
POWER	≤53	54~71	72~90	91~105	106~140	141~160	≥161
FACTORY SETTING	ACCORDING TO RELATED MODEL.						

G. Dial-switch ENC1: The indoor PCB is universal designed for whole series units from 18K to 55K. This ENC1 setting will tell the main program what size the unit is.

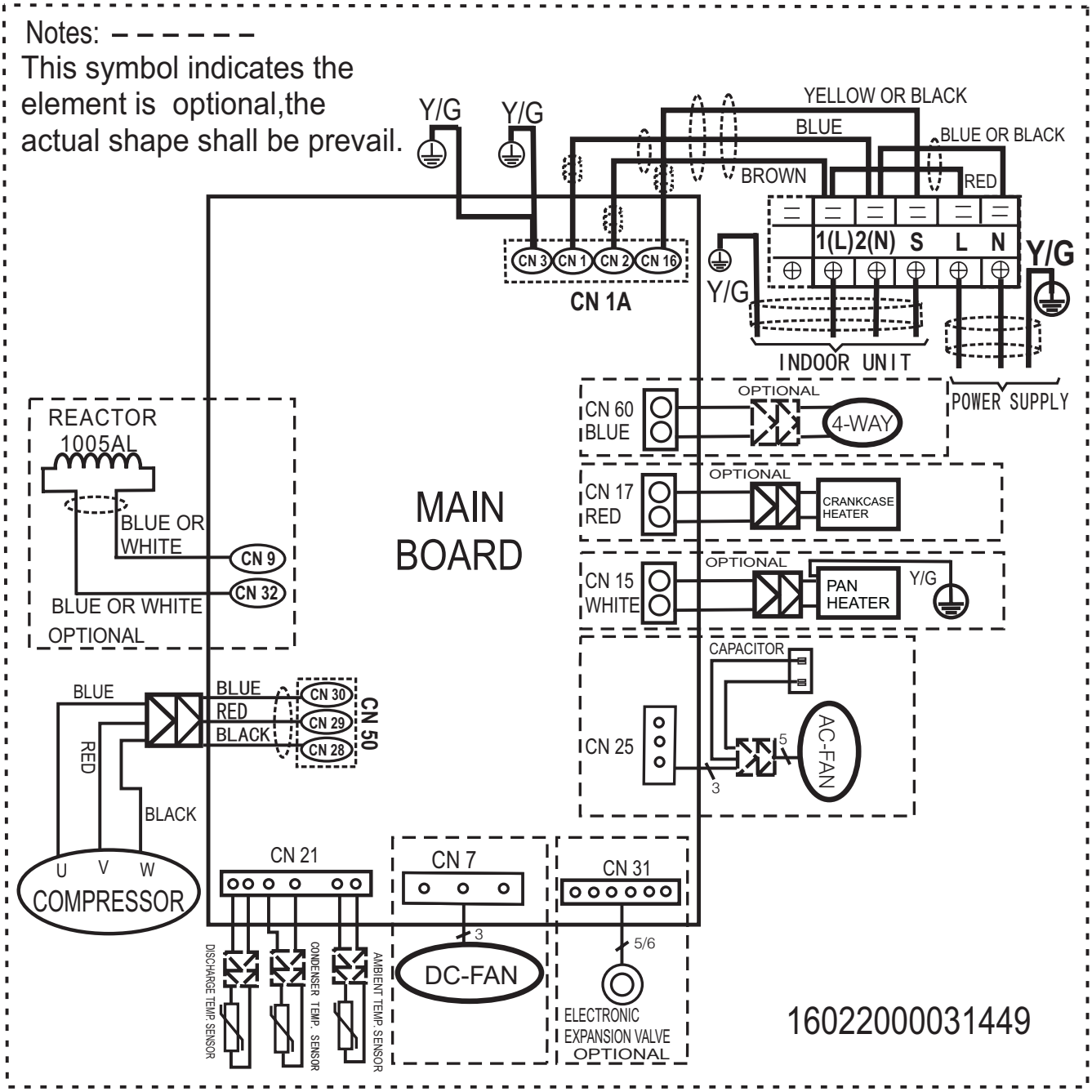
NOTE: Usually there is glue on it because the switch position cannot be changed at random unless you want to use this PCB as a spare part to use in another unit. Then you have to select the right position to match the size of the unit.

“53” means 5.3kW (18K),“105” means 10.5kW(36K), and so on.

5.4 Outdoor Unit

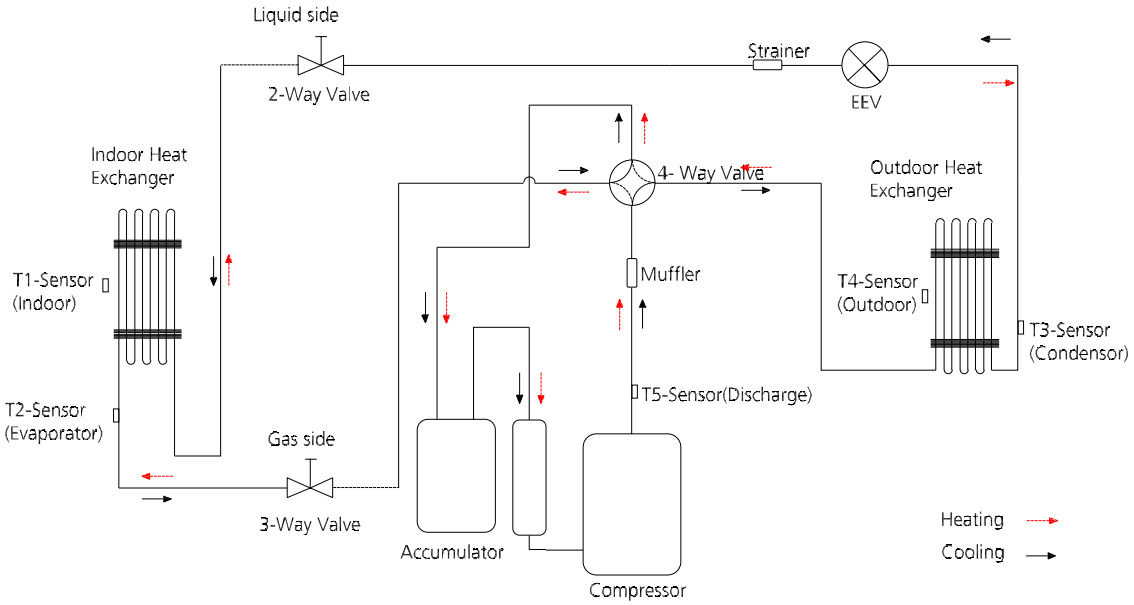
Abbreviation	Paraphrase
CAP1, CAP2, CAP3,CAP4	Capacitor
FAN1	Outdoor Fan Motor
KM8	Contactor
CT1, CT2	AC Current Detector
COMP	Compressor
L-PRO, K2	Low Pressure Switch/Shorting Stub
K1	High Pressure Switch/Shorting Stub
TRANS	Power Transformer
T4	10KΩ RESISTANCE/Outdoor Ambient Temperature
T3	10KΩ RESISTANCE/Coil Temperature of Condenser
XT1	2-Way Terminal/4-Way Terminal
XT2	3-Way Terminal
XT4	Terminal
K3	Compressor Discharge Temperature/Shorting Stub
XP1~XP5,XT5~XT7	Connectors

MC2-Y 53M


Notes: – – – – – –
This symbol indicates the element is optional,the actual shape shall be prevail.
Y/G
Y/G
YELLOW OR BLACK
BLUE
BLUE OR BLACK
BROWN
RED
1(L)2(N) S L N
Y/G
CN 3
CN 1
CN 2
CN 16
CN 1A
Y/G
INDOOR UNIT
POWER SUPPLY
REACTOR
1005AL
BLUE OR WHITE
CN 9
CN 32
BLUE OR WHITE
OPTIONAL
MAIN BOARD
CN 60
BLUE
OPTIONAL
4-WAY
CN 17
RED
OPTIONAL
CRANKCASE HEATER
CN 15
WHITE
OPTIONAL
PAN HEATER
Y/G
CAPACITOR
CN 25
3
5
AC-FAN
BLUE
BLUE
RED
BLACK
CN 30
CN 29
CN 28
CN 50
RED
BLACK
U V W
COMPRESSOR
CN 21
CN 7
CN 31
3
DC-FAN
5/6
ELECTRONIC EXPANSION VALVE
OPTIONAL
DISCHARGE TEMP. SENSOR
CONDENSER TEMP. SENSOR
AMBIENT TEMP. SENSOR
16022000031449

6. Refrigerant Cycle Diagrams

6.1 Heat pump



Model	Pipe Size (Diameter:ø) inch		Piping length (m/ft)		Elevation (m/ft)		Additional Refrigerant
	Gas	Liquid	Rated	Max.	Rated	Max.	
MC2-Y 53M	1/2	1/4	5/16.4	30/98.4	0	20/65.6	12g/m (0.13oz/ft)

7. Capacity Tables

Cooling

ID2-XY 53M+MC2-Y 53M																		
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
350	-15	TC	5.50	5.50	5.50	5.50	5.78	5.90	5.90	5.90	5.93	5.93	5.93	5.93	6.28	6.28	6.28	6.28
		S/T	0.65	0.70	0.73	0.78	0.56	0.60	0.65	0.69	0.52	0.56	0.60	0.64	0.42	0.46	0.50	0.54
		PI	1.09	1.08	1.08	1.09	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
	-10	TC	5.46	5.47	5.47	5.47	5.75	5.87	5.87	5.87	5.90	5.90	5.90	5.90	6.25	6.25	6.25	6.25
		S/T	0.65	0.70	0.74	0.79	0.56	0.61	0.65	0.69	0.52	0.56	0.60	0.64	0.43	0.47	0.50	0.54
		PI	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
	-5	TC	5.43	5.43	5.43	5.43	5.73	5.85	5.85	5.85	5.88	5.88	5.88	5.88	6.24	6.24	6.24	6.24
		S/T	0.65	0.70	0.74	0.79	0.57	0.61	0.65	0.69	0.53	0.57	0.60	0.64	0.43	0.47	0.51	0.55
		PI	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
	0	TC	5.40	5.41	5.41	5.41	5.71	5.83	5.83	5.83	5.87	5.87	5.87	5.87	6.23	6.23	6.23	6.23
		S/T	0.66	0.71	0.74	0.79	0.57	0.61	0.66	0.70	0.53	0.57	0.61	0.65	0.43	0.47	0.51	0.55
		PI	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.09	1.09	1.09	1.09	1.08	1.08	1.08	1.08
	5	TC	5.38	5.38	5.38	5.38	5.68	5.80	5.80	5.80	5.85	5.85	5.85	5.85	6.23	6.23	6.23	6.23
		S/T	0.66	0.71	0.75	0.80	0.57	0.62	0.66	0.70	0.53	0.57	0.61	0.65	0.43	0.47	0.51	0.55
		PI	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.10	1.10	1.10	1.10	1.09	1.09	1.09	1.09
	10	TC	5.34	5.35	5.35	5.35	5.66	5.78	5.78	5.78	5.82	5.82	5.82	5.82	6.21	6.21	6.21	6.21
		S/T	0.66	0.71	0.75	0.80	0.57	0.62	0.66	0.70	0.53	0.57	0.61	0.65	0.44	0.48	0.51	0.55
		PI	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
	15	TC	5.30	5.30	5.30	5.30	5.62	5.74	5.74	5.74	5.79	5.79	5.79	5.79	6.19	6.19	6.19	6.19
		S/T	0.67	0.72	0.76	0.81	0.58	0.62	0.67	0.71	0.54	0.58	0.62	0.66	0.44	0.48	0.52	0.56
		PI	1.14	1.13	1.13	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.13	1.13	1.13	1.13
	20	TC	5.24	5.24	5.24	5.24	5.56	5.56	5.56	5.56	5.73	5.73	5.73	5.73	6.13	6.13	6.13	6.13
		S/T	0.67	0.72	0.76	0.81	0.58	0.63	0.67	0.71	0.54	0.58	0.62	0.66	0.44	0.48	0.52	0.56
		PI	1.18	1.17	1.17	1.18	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.16	1.16	1.16	1.16
	25	TC	4.99	4.99	4.99	4.99	5.30	5.30	5.30	5.30	5.47	5.47	5.47	5.47	5.87	5.87	5.87	5.87
		S/T	0.67	0.72	0.77	0.81	0.58	0.62	0.67	0.71	0.54	0.58	0.62	0.66	0.43	0.47	0.51	0.55
		PI	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	30	TC	4.76	4.76	4.76	4.76	5.07	5.07	5.07	5.07	5.22	5.22	5.22	5.22	5.62	5.62	5.62	5.62
		S/T	0.67	0.72	0.77	0.82	0.58	0.62	0.67	0.71	0.53	0.58	0.62	0.67	0.43	0.47	0.51	0.55
		PI	1.42	1.42	1.42	1.42	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
	35	TC	4.53	4.53	4.53	4.53	4.81	4.81	4.81	4.81	4.96	4.96	5.04	4.96	5.36	5.36	5.36	5.36
		S/T	0.67	0.72	0.77	0.83	0.57	0.62	0.67	0.72	0.53	0.58	0.62	0.67	0.42	0.46	0.51	0.55
		PI	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.57	1.57	1.57	1.57	1.58	1.58	1.58	1.58
	40	TC	4.28	4.28	4.28	4.28	4.55	4.55	4.55	4.55	4.70	4.70	4.74	4.70	5.07	5.07	5.07	5.07
		S/T	0.67	0.73	0.79	0.84	0.57	0.62	0.68	0.73	0.52	0.57	0.62	0.68	0.41	0.45	0.50	0.55
		PI	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.72	1.72	1.72	1.72	1.73	1.73	1.73	1.73
	46	TC	3.97	3.97	3.97	3.97	4.22	4.22	4.22	4.22	4.37	4.37	4.37	4.37	4.71	4.71	4.71	4.71
		S/T	0.68	0.74	0.80	0.85	0.57	0.62	0.68	0.74	0.52	0.57	0.63	0.68	0.40	0.45	0.50	0.55
		PI	1.90	1.90	1.90	1.90	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.93	1.93	1.93	1.93
	50	TC	3.71	3.71	3.71	3.71	3.97	3.97	3.97	3.97	4.11	4.11	4.11	4.11	4.45	4.45	4.45	4.45
		S/T	0.68	0.74	0.81	0.87	0.57	0.63	0.69	0.75	0.52	0.57	0.63	0.69	0.39	0.45	0.50	0.55
		PI	2.06	2.06	2.06	2.06	2.07	2.07	2.07	2.07	2.08	2.08	2.08	2.08	2.09	2.09	2.09	2.09

TC:Total Cooling Capacity (kW)

S/T:Sensible Cooling Capacity Ratio

PI:Power Input(kW)

Heating

ID2-XY 53M+MC2-Y 53M									
HEATING PERFORMANCE AT INDOOR DRY BULB TEMPERATURE									
INDOOR AIRFLOW (CMH)	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
210	-15.0	4.10	4.05	4.03	4.03	1.21	1.25	1.26	1.28
	-10.0	4.38	4.33	4.30	4.30	1.29	1.33	1.35	1.37
	-7.0	4.59	4.53	4.51	4.51	1.37	1.41	1.43	1.45
	-5.6	4.68	4.62	4.59	4.59	1.37	1.41	1.43	1.45
	-2.8	4.77	4.71	4.68	4.65	1.38	1.43	1.45	1.47
	0.0	4.80	4.74	4.71	4.68	1.40	1.44	1.46	1.48
	2.8	5.00	4.94	4.88	4.85	1.42	1.47	1.49	1.51
	5.6	5.38	5.29	5.26	5.23	1.45	1.50	1.52	1.54
	7.0	5.78	5.69	5.57	5.54	1.47	1.54	1.54	1.56
	11.1	5.98	5.89	5.86	5.83	1.50	1.55	1.57	1.60
	13.9	6.18	6.09	6.06	6.01	1.52	1.57	1.59	1.62
	16.7	6.38	6.30	6.24	6.21	1.54	1.59	1.62	1.64
	18.0	6.47	6.38	6.33	6.30	1.55	1.60	1.63	1.65
674	-15.0	4.20	4.15	4.12	4.10	1.22	1.25	1.27	1.29
	-10.0	4.48	4.43	4.40	4.37	1.30	1.34	1.36	1.37
	-7.0	4.70	4.64	4.61	4.58	1.38	1.42	1.44	1.46
	-5.6	4.80	4.74	4.71	4.68	1.38	1.42	1.45	1.47
	-2.8	4.88	4.82	4.80	4.77	1.40	1.44	1.46	1.48
	0.0	4.91	4.82	4.80	4.77	1.41	1.45	1.48	1.50
	2.8	5.09	5.03	5.00	4.97	1.44	1.49	1.51	1.53
	5.6	5.46	5.41	5.38	5.32	1.47	1.52	1.54	1.56
	7.0	5.87	5.80	5.69	5.66	1.49	1.56	1.56	1.58
	11.1	6.09	6.04	5.98	5.95	1.52	1.57	1.59	1.62
	13.9	6.30	6.21	6.18	6.12	1.54	1.59	1.62	1.64
	16.7	6.50	6.41	6.35	6.33	1.57	1.62	1.64	1.67
	18.0	6.62	6.50	6.47	6.41	1.58	1.63	1.65	1.68
880	-15.0	4.23	4.18	4.16	4.16	1.24	1.27	1.29	1.31
	-10.0	4.52	4.47	4.44	4.44	1.32	1.36	1.37	1.39
	-7.0	4.74	4.68	4.65	4.65	1.40	1.44	1.46	1.48
	-5.6	4.82	4.77	4.74	4.74	1.40	1.44	1.46	1.49
	-2.8	4.91	4.85	4.82	4.80	1.42	1.46	1.48	1.50
	0.0	4.94	4.88	4.85	4.82	1.43	1.47	1.50	1.52
	2.8	5.14	5.09	5.06	5.03	1.46	1.50	1.53	1.55
	5.6	5.52	5.46	5.43	5.38	1.49	1.54	1.56	1.58
	7.0	5.92	5.86	5.75	5.72	1.51	1.58	1.58	1.60
	11.1	6.15	6.09	6.04	6.01	1.54	1.59	1.61	1.64
	13.9	6.38	6.30	6.24	6.18	1.56	1.61	1.64	1.66
	16.7	6.59	6.47	6.44	6.38	1.59	1.64	1.66	1.69
	18.0	6.67	6.59	6.53	6.47	1.60	1.65	1.67	1.70

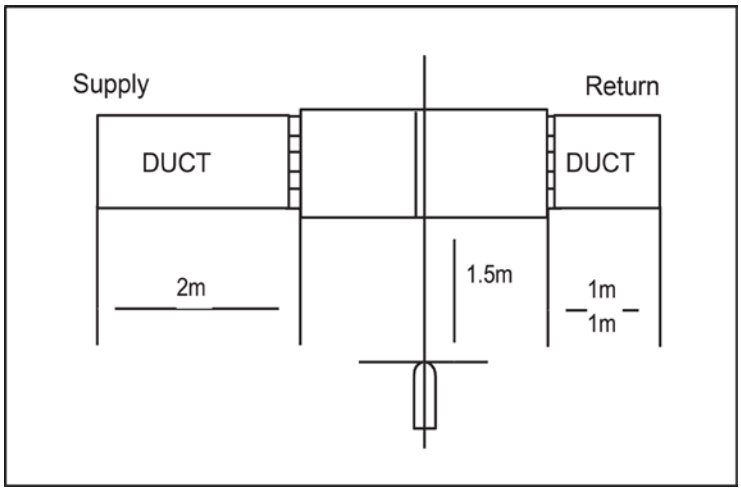
8. Capacity Correction Factor for Height Difference

8.1 Heat pump models

Model	ID2-XY 53M / MC2-Y 53M		Pipe Length (m)			
Cooling			5	10	20	30
Height difference H (m)	Indoor Upper than Outdoor	20			0.928	0.912
		10		0.969	0.937	0.921
		5	0.995	0.979	0.946	0.930
		0	1.000	0.984	0.951	0.935
	Outdoor Upper than Indoor	-5	1.000	0.984	0.951	0.935
		-10		0.984	0.951	0.935
		-20			0.951	0.935
Heating			5	10	20	30
Height difference H (m)	Indoor Upper than Outdoor	20			0.982	0.976
		10		0.994	0.982	0.976
		5	1.000	0.994	0.982	0.976
		0	1.000	0.994	0.982	0.976
	Outdoor Upper than Indoor	-5	0.992	0.986	0.974	0.968
		-10		0.978	0.966	0.960
		-20			0.959	0.953

9. Noise Criterion Curves

9.1 Indoor Unit



Notes:

-Sound measured at 1.5m away from the center of the unit.

-Data is valid at free field condition

-Data is valid at nominal operation condition

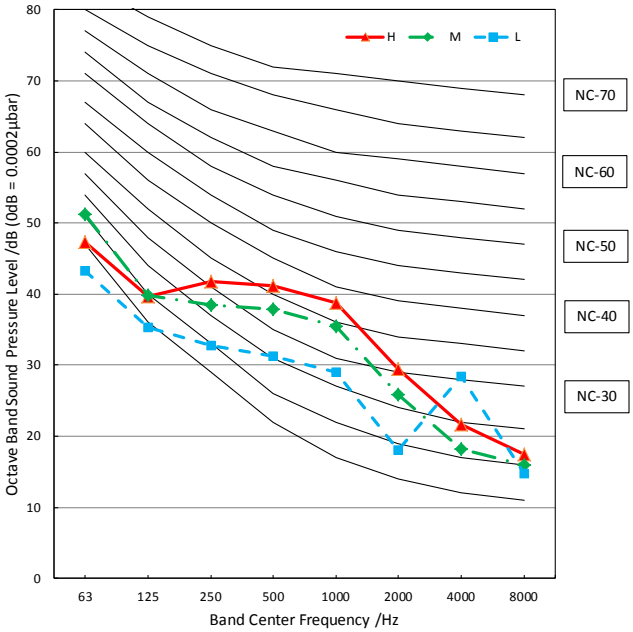
-Reference acoustic pressure OdB = 20μPa

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

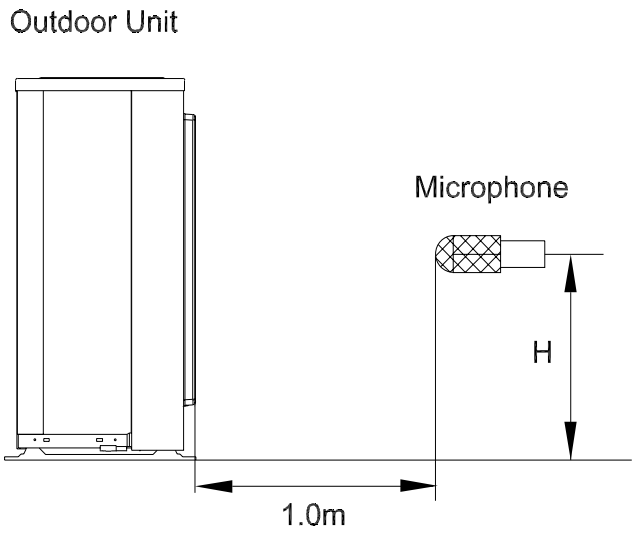
-The operating conditions are assumed to be standard.

Model	Power supply (Outdoor)	Noise level dB(A)		
		H	M	L
MC2-Y 53M	220~240-1-50	41.5	38	33

ID2-XY 53M


H
M
L
NC-70
NC-60
NC-50
NC-40
NC-30
Octave Band Sound Pressure Level /dB (0dB = 0.0002μbar)
Band Center Frequency /Hz
0
10
20
30
40
50
60
70
80
63
125
250
500
1000
2000
4000
8000

9.2 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

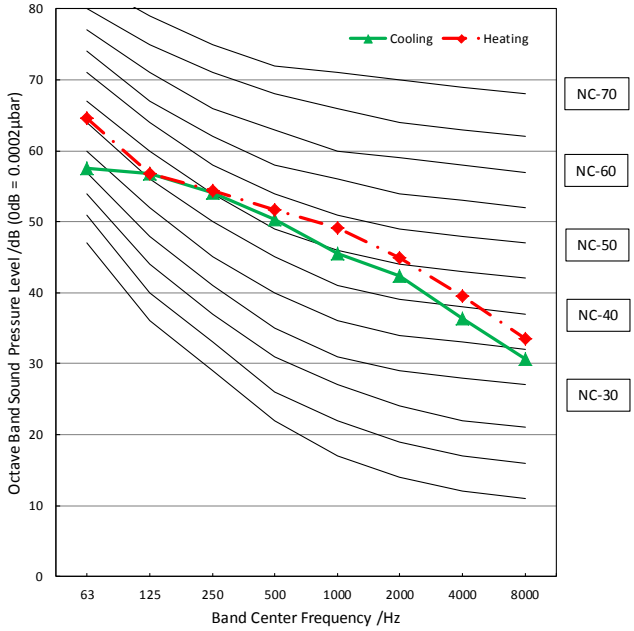
-Reference acoustic pressure OdB=20μPa

-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.

Model	Noise level dB(A)
MC2-Y 53M	60

MC2-Y 53M

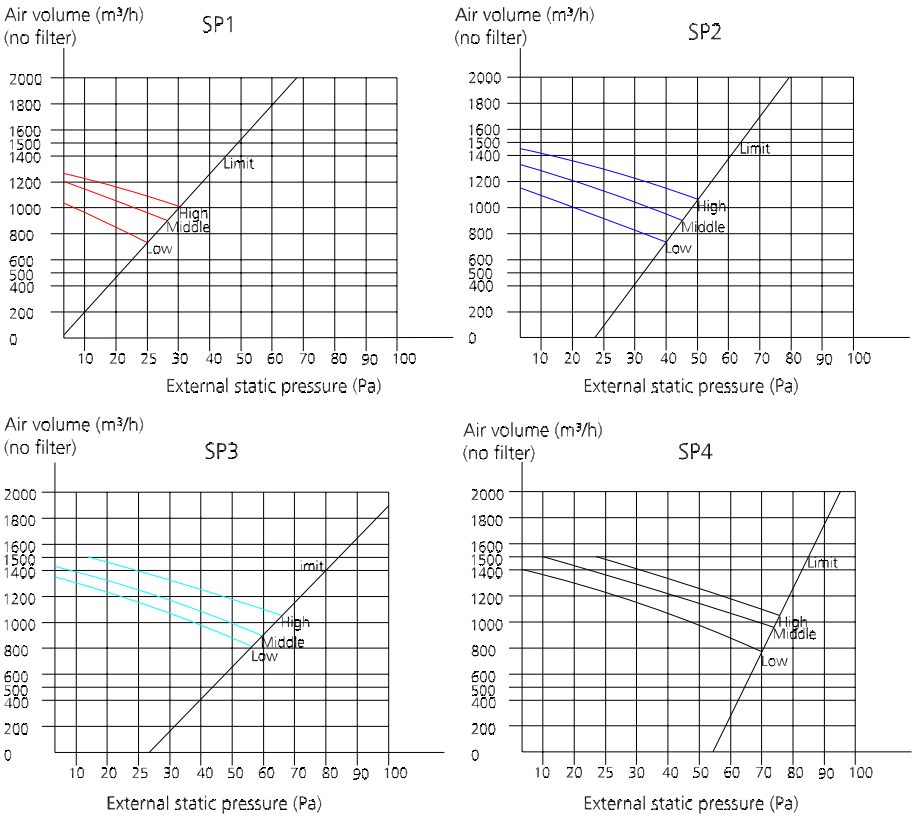

Cooling
Heating
NC-70
NC-60
NC-50
NC-40
NC-30
Octave Band Sound Pressure Level /dB (0dB = 0.0002μbar)
80
70
60
50
40
30
20
10
0
63
125
250
500
1000
2000
4000
8000
Band Center Frequency /Hz

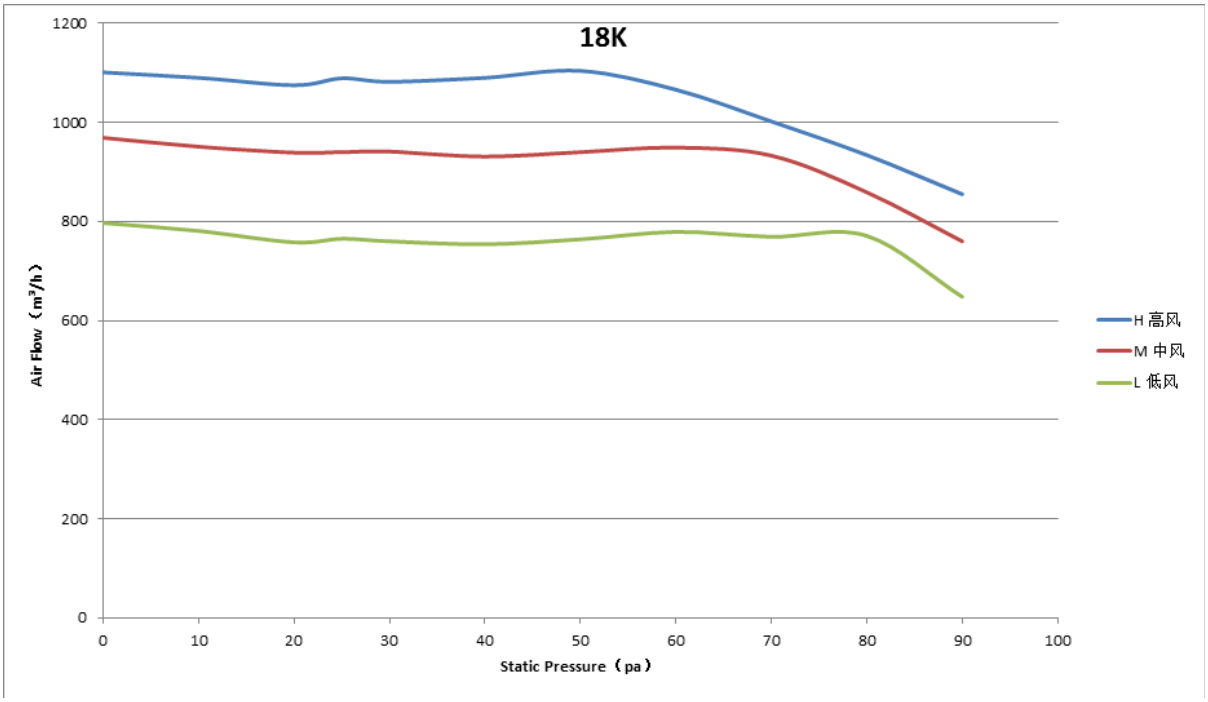
10. Electrical Characteristics

Type		18000 Btu/h
Phase		1-phase
Frequency and Voltage		220-240V, 50Hz
Circuit Breaker/ Fuse (A)		25/20
Indoor Unit Power Wiring (mm^2)		
Outdoor Unit Power Wiring (mm^2)		3×2.5
Indoor/Outdoor Connecting Wiring (mm2)	Ground Wiring	2.5
	Strong Electric Signal	4×1.0(4×2.5 with auxiliary electric heater)
	Weak Electric Signal	

11. Static Pressure

18K (53M)

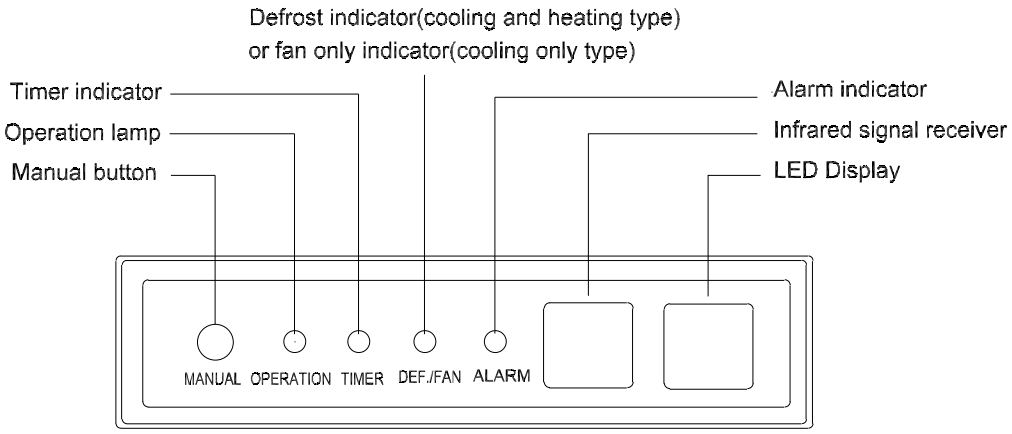




Product Features

Contents

1. Display Function



2. Safety Features

Compressor three-minute delay at restart

Compressor functions are delayed for up to ten seconds upon the first startup of the unit, and are delayed for up to three minutes upon subsequent unit restarts.

Automatic shutoff based on discharge temperature

If the compressor discharge temperature exceeds a certain level for nine seconds, the compressor ceases operation.

Automatic shutoff based on fan speed

For Duct type:

If a fault occurs on the air volume regulator or the regulator enters protection mode, it sends the error message CF and an instruction to reduce fan speed to the master. The message and the instruction can be inquired with the remote controller or the wired controller. (Fault and protection information are displayed for one minute). After a fault occurs, the master unit shows the error code E3 and the fault count for one minute. If the fault occurs three times, then the fan is unable to resolve the problem independently. External shutdown by a remote controller, wired controller, or central controller must be used to clear the fan fault and fault count. The fan runs normally for 5 minutes while clearing fault count.

0	No malfunction
1	P0 Overcurrent
2	Overpressure
3	Overload
4	Over speed
5	Startup malfunction
6	Lack of phase
7	DC voltage too low
8	Communication fault
9	Parameter fault
10	L3 Current limited
11	L5 Voltage limited
12	Target speed cannot be met during the static pressure calculation process

For other types

If the indoor fan speed registers below 200RPM or over 2100RPM for an extended period of time, the unit ceases operation

Inverter module protection

The inverter module has an automatic shutoff mechanism based on the unit's current, voltage, and temperature.

If automatic shutoff is initiated, the corresponding error code is displayed on the indoor unit and the unit ceases operation.

Indoor fan delayed operation

- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of setting time or the louver is in place.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold wind function.

Compressor preheating

Preheating is automatically activated when T4 sensor is lower than setting temperature.

Sensor redundancy and automatic shutoff

- If one temperature sensor malfunctions, the air conditioner continues operation and displays the corresponding error code, allowing for emergency use.
- When more than one temperature sensor is malfunctioning, the air conditioner ceases operation.

3. Basic Functions

3.1 Table

Functions		Cooling Mode&Heating mode		Heating Mode			
		Outdoor Fan Control		Defrosting Mode		Anti-cold Air Function	
Cases		Case 1: Compressor Frequency and T4	Case 2:T4	Case 1:T3 and T4,15 min	Case 2: T3,10 min	Case 1	Case 2
Models	ID2-XY 53M	✓		✓			✓

Note: The detailed description of case 1 or case 2 is shown in the following function sections(from 3.4 to 3.6).

3.2 Abbreviation

Unit element abbreviations

Abbreviation	Element
T1	Indoor room temperature
T2	Coil temperature of evaporator
T3	Coil temperature of condenser
T4	Outdoor ambient temperature
TP	Compressor discharge temperature
Tsc	Adjusted setting temperature

In this manual, such as CDIFTEMP, HDIFTEMP2, TCE1, TCE2...etc., they are well-setting parameter of EEPROM.

3.3 Fan Mode

When fan mode is activated:

- The outdoor fan and compressor are stopped.
- Temperature control is disabled and no temperature setting is displayed.
- The indoor fan speed can be set to 1%~100%, or low, medium, high and auto.
- The louver operations are identical to those in cooling mode.
- Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 24°C.

3.4 Cooling Mode

3.4.1 Compressor Control

Reach the configured temperature:

1) When the compressor runs continuously for less than 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
     - While calculated frequency(fb) is less than minimum limit frequency(FminC).
     - While protective time is more than or equal to ten minutes.
     - While T1 is lower than or equal to (Tsc-CDIFTEMP-0.5°C)
2) When the compressor runs continuously for more than 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
     - When calculated frequency(fb) is less than minimum limit frequency(FminC).
     - When protective time is more than or equal to ten minutes.
     - When T1 is lower than or equal to (Tsc-CDIFTEMP).
3) If one of the following conditions is satisfied, not judge protective time.
   - Compressor running frequency is more than test frequency.
   - When compressor running frequency is equal to test frequency, T4 is more than 15°C or no T4 or T4 fault.
   - Change setting temperature.
   - Turbo or sleep function on/off
   - Various frequency limit shutdown occurs.

3.4.2 Indoor Fan Control

1) In cooling mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or low, medium, high and auto.
2) Auto fan action in cooling mode:
   - Descent curve
     - When T1-Tsc is lower than or equal to 3.5°C, fan speed reduces to 80%;
     - -When T1-Tsc is lower than or equal to 1°C, fan speed reduces to 60%;
     - -When T1-Tsc is lower than or equal to 0.5°C, fan speed reduces to 40%;
     - -When T1-Tsc is lower than or equal to 0°C, fan speed reduces to 20%;
     - -When T1-Tsc is lower than or equal to -0.5°C, fan speed reduces to 1%.
   - Rise curve
     - When T1-Tsc is higher than 0°C, fan speed increases to 20%;
     - -When T1-Tsc is higher than 0.5°C, fan speed increases to 40%;
     - -When T1-Tsc is higher than 1°C, fan speed increases to 60%;
     - -When T1-Tsc is higher than 1.5°C, fan speed increases to 80%;
     - -When T1-Tsc is higher than 4°C, fan speed increases to 100%.

3.4.3 Outdoor Fan Control

Case 1:

- The outdoor unit will be run at different fan speed according to T4 and compressor frequency.
- For different outdoor units, the fan speeds are

different.

Case 2:

- The outdoor unit will be run at different fan speed according to T4.
- For different outdoor units, the fan speeds are different.

3.4.4 Condenser Temperature Protection

When the condenser temperature exceeds a configured value, the compressor ceases operation.

3.4.5 Evaporator Temperature Protection

When evaporator temperature drops below a configured value, the compressor and outdoor fan cease operation.

3.5 Heating Mode(Heat Pump Units)

3.5.1 Compressor Control

1) Reach the configured temperature

- If the following conditions are satisfied, the compressor ceases operation.
  - While calculated frequency(fb) is less than minimum limit frequency(FminH).
  - When protective time is more than or equal to ten minutes.
  - When T1 is higher than or equal to Tsc+ HDIFTEMP2.

Note: HDIFTEMP2 is EEPROM setting parameter. It is 2°C usually.

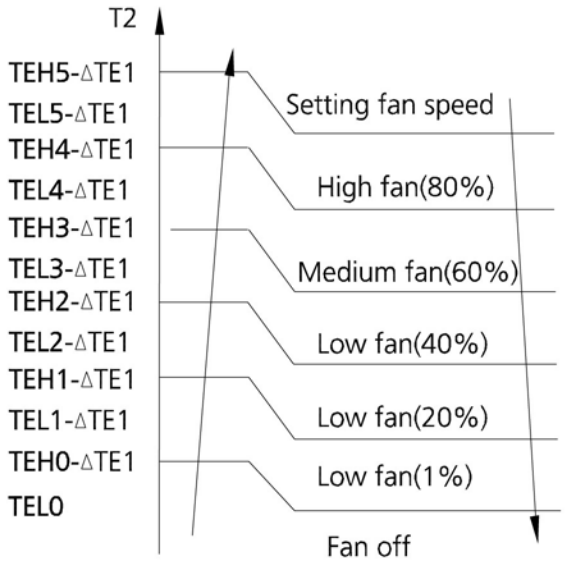
- If one of the following conditions is satisfied, not judge protective time.
  - Compressor running frequency is more than test frequency.
  - When compressor running frequency is equal to test frequency, T4 is more than 15°C or no T4 or T4 fault.
  - Change setting temperature.
  - Turbo or sleep function on/off.

2) When the current is higher than the predefined safe value, surge protection is activated, causing the compressor to cease operations.

3.5.2 Indoor Fan Control:

1) In heating mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%,or low, medium, high and auto.

- . Anti-cold air function
  - The indoor fan is controlled by the indoor temperature T1 and indoor unit coil temperature T2.



Case 1:

T1 ≥ 19°C(66.2°F)	ΔTE1=0
15°C(59°F) ≤ T1 <19°C(66.2°F)	ΔTE1=19°C−T1 (34.2°F-T1)
T1<15°C(59°F)	ΔTE1=4°C(7.2°F)

Case 2: ΔTE1=0

2) Auto fan action in heating mode:

- Rise curve
  - When T1-Tsc is higher than -1.5°C, fan speed reduces to 80%;
  - -When T1-Tsc is higher than 0°C, fan speed reduces to 60%;
  - -When T1-Tsc is higher than 0.5°C, fan speed reduces to 40%;
  - -When T1-Tsc is higher than 1°C, fan speed reduces to 20%.
- Descent curve
  - When T1-Tsc is lower than or equal to 0.5°C, fan speed increases to 20%;
  - -When T1-Tsc is lower than or equal to 0°C, fan speed increases to 60%;
  - -When T1-Tsc is lower than or equal to -1.5°C, fan speed increases to 80%;
  - -When T1-Tsc is lower than or equal to -3°C, fan speed increases to 100%.

3.5.3 Outdoor Fan Control:

Case 1:

- The outdoor unit will be run at different fan speed

according to T4 and compressor frequency.

- For different outdoor units, the fan speeds are different.

Case 2:

- The outdoor unit will be run at different fan speed according to T4.
- For different outdoor units, the fan speeds are different.

3.5.4 Defrosting mode

Case 1:

- The unit enters defrosting mode according to the temperature value of T3 and T4 as well as the compressor running time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation, the defrost light of the indoor unit will turn on, and the "dF" symbol is displayed.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above TCDE1.
  - T3 maintained above TCDE2 for 80 seconds.
  - Unit runs for 15 minutes consecutively in defrosting mode.

Case 2:

- The unit enters defrosting mode according to the temperature value of T3 as well as the compressor running time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation, the defrost light of the indoor unit will turn on, and the "dF" symbol is displayed.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above TCDE1.
  - T3 maintained above TCDE2 for 80 seconds.
  - Unit runs for 10 minutes consecutively in defrosting mode.
  -

3.5.5 Evaporator Coil Temperature Protection

- When the evaporator temperature exceeds a preset protection value, the compressor ceases operation.

3.6 Auto-mode

- This mode can be selected with the remote controller and the temperature setting can be adjusted between 16°C~30°C.
- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT (ΔT =T1-TS).

ΔT	Running mode
ΔT>2°C(3.6°F)	Cooling
-3℃(-5.4°F)≤ΔT≤2°C(3.6°F)	Fan-only
ΔT<-3°C(-5.4°F)	Heating*

Heating*: In auto mode, cooling only models run the fan

- Indoor fan will run at auto fan speed.
- The louver operates same as in relevant mode.
- If the machine switches mode between heating and cooling, the compressor will keep stopping for certain time and then choose mode according to ΔT.

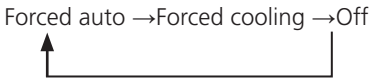
3.7 Drying mode

- In drying mode, AC operates the same as auto fan in cooling mode.
- All protections are activated and operate the same as they do that in cooling mode.
- Low Room Temperature Protection

If the room temperature is lower than 10°C, the compressor ceases operations and does not resume until room temperature exceeds 12°C.

3.8 Forced operation function

Press the AUTO/COOL button, the AC will run as below sequence:



- Forced cooling mode:

The compressor and outdoor fan continue to run and the indoor fan runs at breeze speed. After running for 30 minutes, the AC will switch to auto mode with a preset temperature of 24°C(76°F).

- Forced auto mode:

Forced auto mode operates the same as normal auto mode with a preset temperature of 24°C(76°F).

- The unit exits forced operation when it receives the following signals:
  - Switch off
  - Changes in:
    - mode
    - fan speed

- sleep mode
- Follow me

3.9 Timer Function

- The timing range is 24 hours.
- Timer On. The machine turns on automatically at the preset time.
- Timer Off. The machine turns off automatically at the preset time.
- Timer On/Off. The machine turns on automatically at the preset On Time, and then turns off automatically at the preset Off Time.
- Timer Off/On. The machine turns on automatically at the preset Off Time and then turns off automatically at the preset On Time.
- The timer does not change the unit operation mode. If the unit is off now, it does not start up immediately after the "timer off" function is set. When the setting time is reached, the timer LED switches off and the unit running mode remains unchanged.
- The timer uses relative time, not clock time

3.10 ECO function

- The ECO function is available in cooling, heating, or auto mode.
- The operational process for sleep mode is as follows:
  - When cooling, the temperature rises 1°C (to not higher than 30°C) every hour. After 2 hours, the temperature stops rising and the indoor fan is fixed at low speed.
  - When heating, the temperature decreases 1°C(to not lower than 17°C) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at low speed. Anti-cold wind function takes priority.
- The operating time for sleep mode is 8 hours, after which, the unit exits this mode and does not switches off.

3.11 Auto-Restart function

- The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings and in the case of a sudden power failure, will restore those setting automatically within 3 minutes after power returns.

4. Optional Functions

4.1 Drain Pump Control

- Use the water-level switch to control drain pump.
- The system checks the water level every 5 seconds.
- When the A/C operates in cooling. the pump begins running immediately and continuously until cooling stops.
- When the A/C operates in forced cooling mode and defrosting mode, the pump is running continuously.
- If the water level increases up to the control point, the LED displays an alarm code and the drain pump opens and continually monitors the water level. If the water level falls and LED alarm code is no longer displayed (drain pump close delay is 1 minute), the unit goes back into its last mode. Otherwise, the entire system (including the pump) stops and the LED displays an alarm again after 3 minutes.

4.2 8°C Heating

In heating mode, the temperature can be set to as low as 8°C, preventing the indoor area from freezing if unoccupied during severe cold weather.

4.3 Self clean

- If you press "Self Clean" when the unit is in cooling, drying, auto cooling or auto drying mode:
  - The indoor unit will run in low fan mode for a certain time, then ceases operation.
- Self Clean keeps the indoor unit dry and prevents mold growth.
- When match with multi outdoor unit, this function is disabled.

4.4 Follow me

- If you press "Follow Me" on the remote, the indoor unit will beep. This indicates the follow me function is active.
- Once active, the remote control will send a signal every 3 minutes, with no beeps. The unit automatically sets the temperature according to the measurements from the remote control.
- The unit will only change modes if the information from the remote control makes it necessary, not from the unit's temperature setting.
- If the unit does not receive a signal for 7 minutes or you press "Follow Me," the function turns off. The unit regulates temperature based on its own sensor

and settings.

4.5 Silence

- Press “Silence” on the remote control to enable the SILENCE function. While this function is active, the compressor frequency is maintained at a lower level than F3. The indoor unit will run at faint breeze(1%), which reduces noise to the lowest possible level.
- When match with multi outdoor unit, this function is disabled.

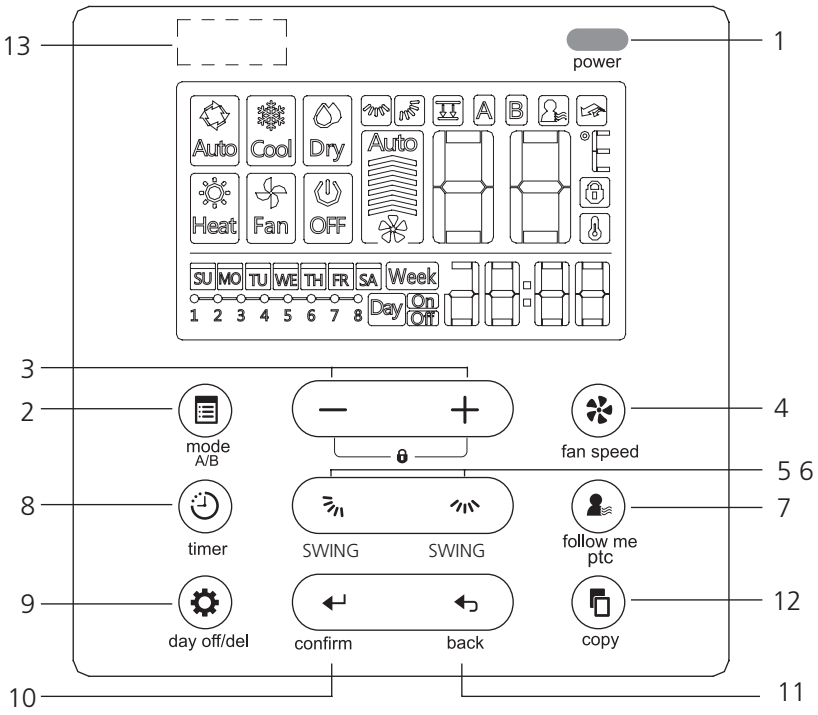
5. Remote Controller Functions

5.1 LCD Wired Remote Controller

5.1.1 LCD Wired Remote Controller KJR-120C1E(Optional)

The KJR-120C1E wired remote controller is optional for all types.

i) Buttons and Functions



1. POWER button

Turn on of turn off the unit.

2. MODE(A/B) button

Used to select the operation mode: Auto / Cooling / Drying / Heating / Fan;

Hold to active the operation of auto-lifting panel when off

3. Adjust button

To set temperature, time and timer; set up or down the auto-lifting panel

4. FAN SPEED button

Used to select the fan speed.

5. Up-down airflow direction and swing Button

Press for adjusting the angel of louver, hold for vertical swing; individual louver control for cassette panel

6. Left-righ airflow swing Button

Press for activing the horizontal swing

7. FOLLOW ME(PTC) button

Allows the remote control to act as a remote thermostat and send temperature information from its current location.

8. TIMER button

To set timer on and timer off time of one day

9. DELAY/DAY OFF button

To set 1 to 2 hours delay off for each day or a whole day off in a weekly timer schedule

10. CONFIRM button

To confirm an setting or call up the menu

11. BACK button

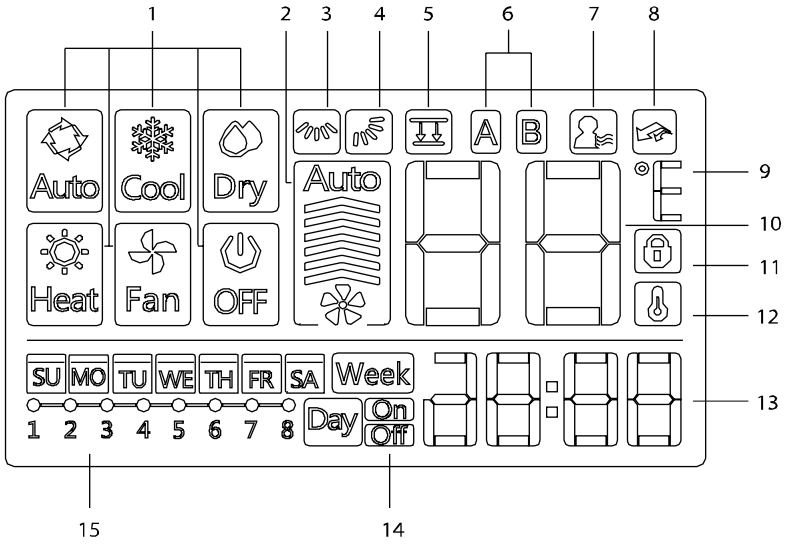
Back to previous operation or superior menu

12. COPY button

Copy timer setting of one day to another in weekly schedule setting

13 Infrared remote receiver (on some models)

ii) LCD Screen



1 Operation mode indication

2 Fan speed indication

3 Left-right swing indication

4 Up-down swing indication

5 Faceplate function indication

6 Main unit and secondary unit indication

7 Follow me function indication

8 PTC function indication

9 C° / F° indication

10 Temperature display

11 Lock indication

12 Room temperature indication

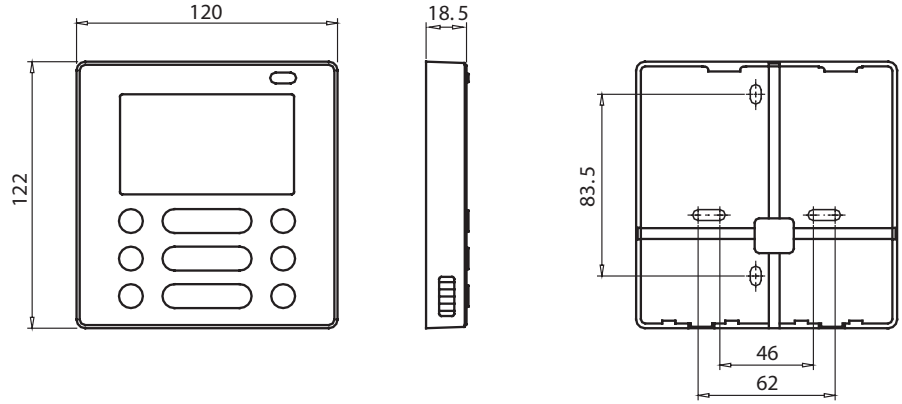
13 Clock display

14 On/Off timer

15 Timer display

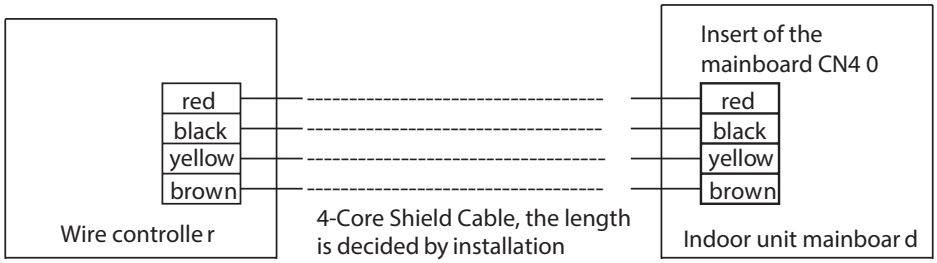
iii) Installation

- **Dimensions**



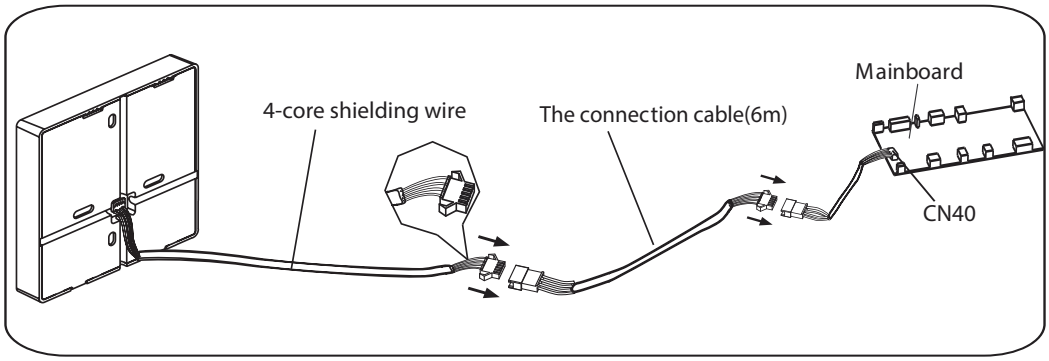
- **Wiring diagram**

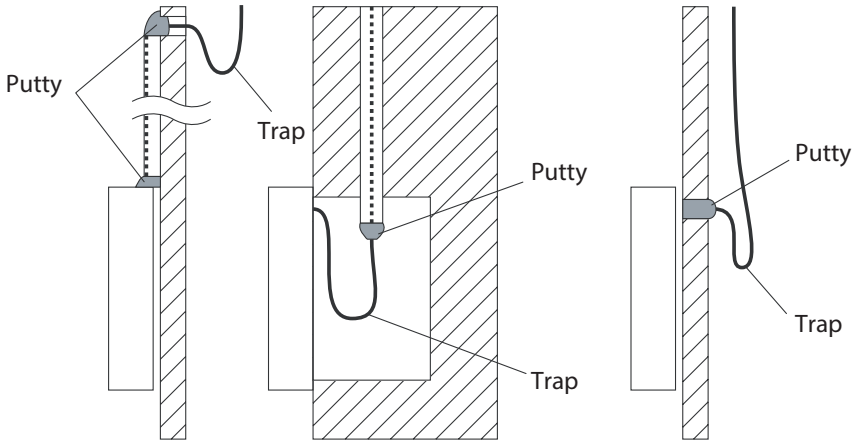
Refer to the following diagram to wire the wall-mounted remote control to the indoor unit.



- **Installation Diagram**

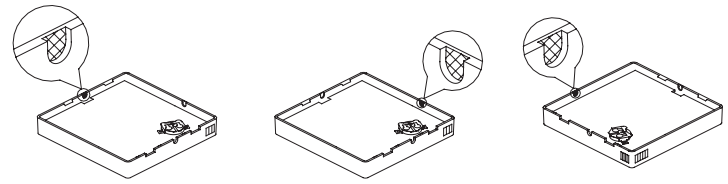
Connect the female joint of wires group from the mainboard with the male joint of connective wires group. Then connect the other side of connective wires group with the male joint of wires group leads from wire controller.





Note: DO NOT allow water to enter the remote control. Use the trap and putty to seal the wires.

- **For exposed mounting, four outletting positions. There are three need cutting.**

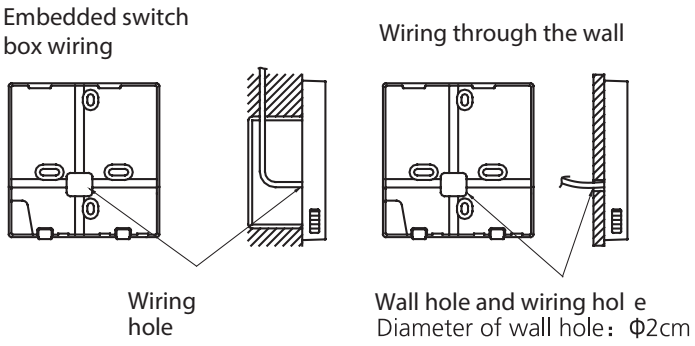


Cutting place of top side wire outlet

Cutting place of left side wire outlet

Cutting place of rig ht side wire outlet

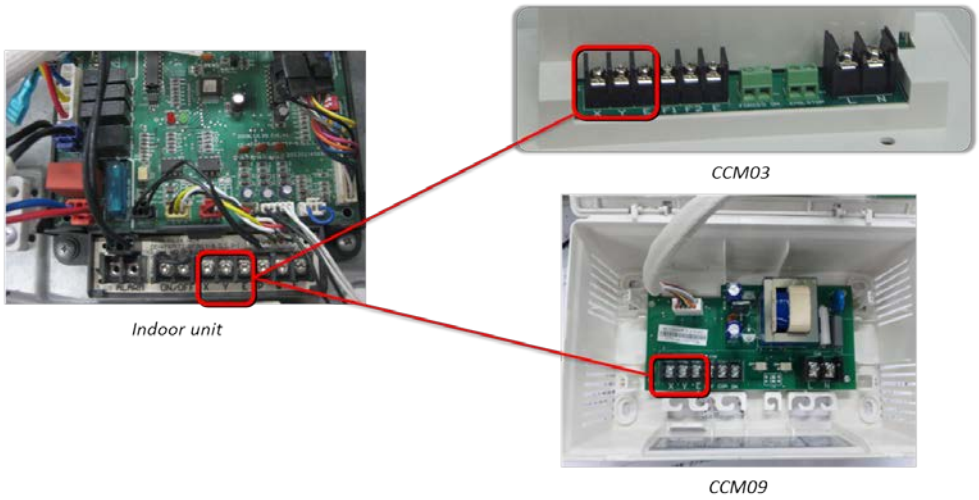
- **For shielded wiring, please refer to the picture below.**



5.2 Centralized Controller

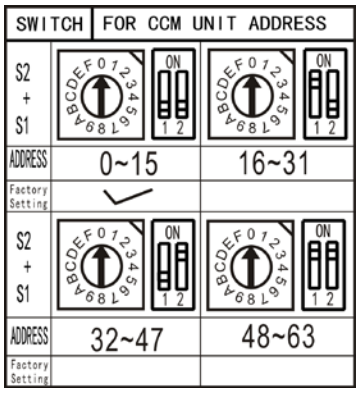
1) Connection

For Light commercial air conditioner with XYE port, it can be directly connected to Centralized Controller (CCM03, CCM09).



2) Address setting

When setting the address, please make sure the unit is powered off. The address can be set from 0 to 63 by the switch. Turn on the unit, then the address will be effective.



Note: For light commercial aire conditioner with XYE port, it can be also connected to BMS (Building Management System).

If there is any CAC (central air conditioner) connecting with the central controller at the same time, please set the address from largest (63,62,61…), since the CAC units could obtain address automatically from the smallest (00,01,02…)

5.3 Using the wire controller to set external static pressure

- You can use the unit's automatic airflow adjustment function to set external static pressure.
- Automatic airflow adjustment is the volume of blow-off air that has been automatically adjusted to the quantity rated.

1. Make sure the test run is done with a dry coil. If the coil is not dry, run the unit for 2 hours in FAN ONLY mode to dry the coil.

2. Check that both power supply wiring and duct installation have been completed. Check that any closing dampers are open. Check that the air filter is properly attached to the air suction side passage of the unit.

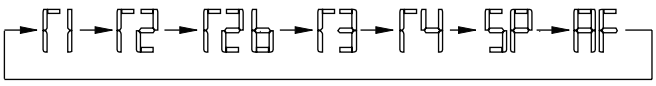
3. If there is more than one air inlet and outlet, adjust the dampers so that the airflow rate of each air inlet and outlet conforms with the designed airflow rate. Make sure the unit is in FAN ONLY mode. Press and set the airflow adjustment button on the remote control to change the airflow rate from H or L.

4. Set the parameters for automatic airflow adjustment. When the air conditioning unit is off, perform the following steps:

- When the unit is turned off, hold the MODE button and

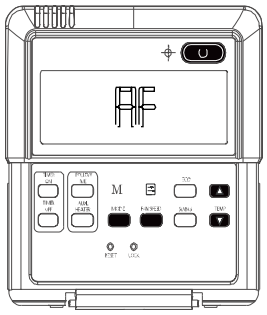
FAN button down together for three seconds. ("AF" indicator flashes for 3 times.)

- Press "△" or "▽" to select the AF.



- Press "MODE". The air conditioning unit will then start the fan for airflow automatic adjustment.

After 3 to 6 minutes, the air conditioning unit stops operating once automatic airflow adjustment has finished.



Caution: DO NOT adjust the dampers when automatic airflow adjustment is active.

Caution:

• If there is no change after airflow adjustment in the ventilation paths, be sure to reset automatic airflow adjustment.

• If there is no change to ventilation paths after airflow adjustment,contact your dealer, especially if this occurs after testing the outdoor unit or if the unit has been moved to a different location.

• Do not use automatic airflow adjustment with remote control,if you are using booster fans, outdoor air processing unit, or a HRV via duct.

• If the ventilation paths have been changed, reset airflow automatic adjustment as described from step 3 onwards.

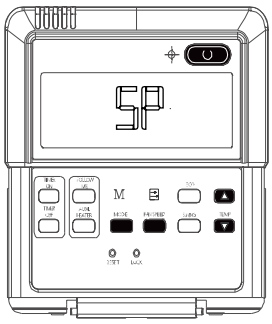
5.4 Using the wire controller to set airflow rate

When the air conditioning unit is off, perform the following steps:

1.Press"MODE" and "FAN" for three seconds.

2.Press "△" or "▽" to select the SP.

3.Press "MODE" to set the airflow rate in the range of 0~4.



"0": No airflow change

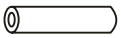
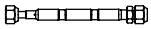
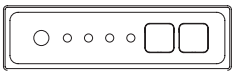
"1"~"4":Airflow increase progressively

4.Press "ON/OFF" to finish the airflow setting.

Installation

Contents

Accessories

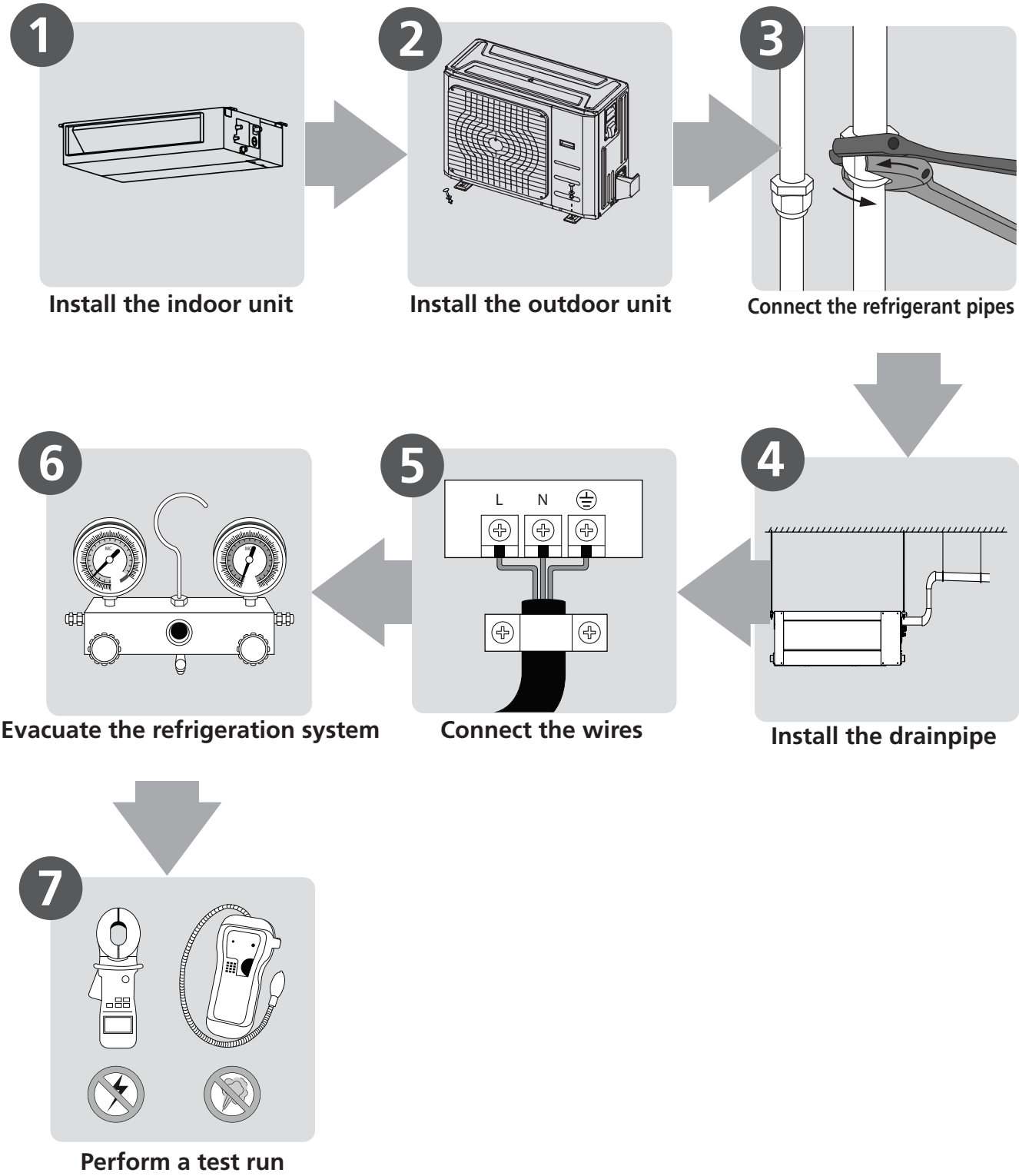
	Name	Shape	Quantity
Tubing & Fittings	Soundproof / insulation sheath		2
	Seal sponge (some models)		1
	Orifice (some models)		1
Drainpipe Fittings (for cooling & heating)	Drain joint (some models)		1
	Seal ring (some models)		1
EMC Magnetic Ring (some models)	Magnetic ring(Wrap the electric wires S1 & S2 (P & Q & E) around the magnetic ring twice)	 S1&S2(P&Q&E)	1
	Magnetic ring(Hitch on the connective cable between the indoor unit and outdoor unit after installation.)		1
Others	Installation use and maintenance manual	-	1
	Connecting wire for display (2m)	-	1(on some models)
	Cord protection rubber ring		1(on some models)
	Display panel *Just for testing purposes only		1(on some models-KJR-120G,KJR-120H)

Optional accessories:

- There are two types of remote controls: wired and wireless.
- Select a remote controller based on customer preferences and requirements and install in an appropriate place.
- Refer to catalogues and technical literature for guidance on selecting a suitable remote controller.

1. Installation Overview

Installation Order



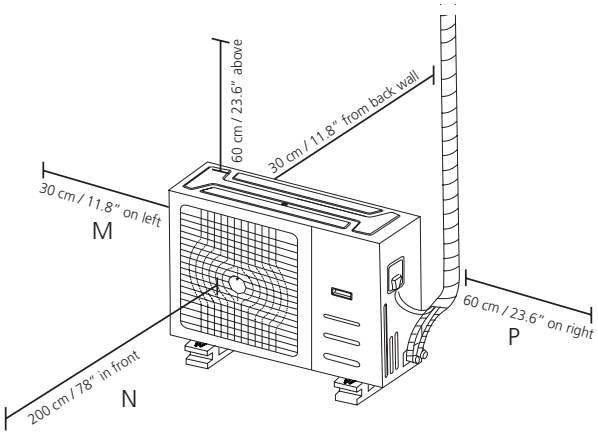
2. Location selection

2.1 Unit location selection can refer to installation manual.

2.2 DO NOT install the unit in the following locations:

- Where oil drilling or fracking is taking place.
- Coastal areas with high salt content in the air.
- Areas with caustic gases in the air, such as near hot springs.
- Areas with power fluctuations, such as factories.
- Enclosed spaces, such as cabinets.
- Areas with strong electromagnetic waves.
- Areas that store flammable materials or gas.
- Rooms with high humidity, such as bathrooms or laundry rooms.
- If possible, DO NOT install the unit where it is exposed to direct sunlight.

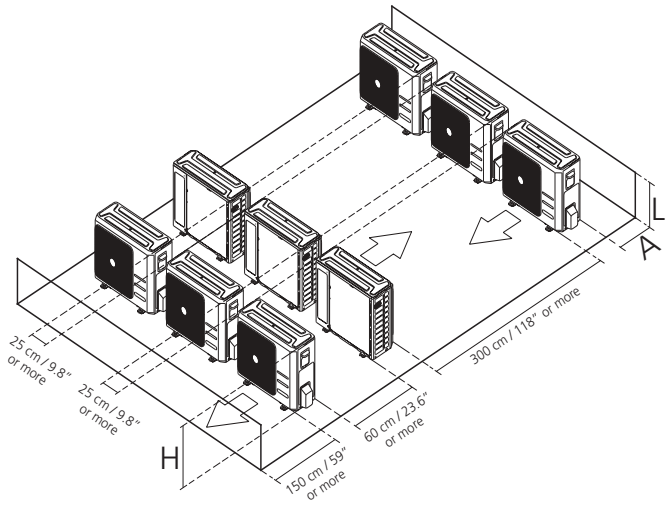
2.3 The minimum distance between the outdoor unit and walls described in the installation guide does not apply to airtight rooms. Be sure to keep the unit unobstructed in at least two of the three directions (M, N, P)



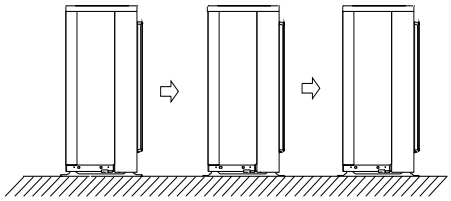
2.4 Rows of series installation

The relations between H, A and L are as follows.

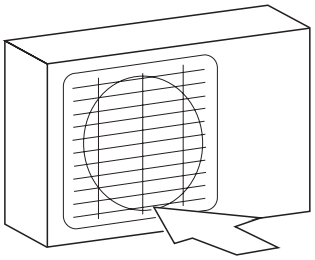
	L	A
L ≤ H	L ≤ 1/2H	25 cm / 9.8" or more
	1/2H < L ≤ H	30 cm / 11.8" or more
L > H	Can not be installed	



DO NOT install the rows of series like following figure.



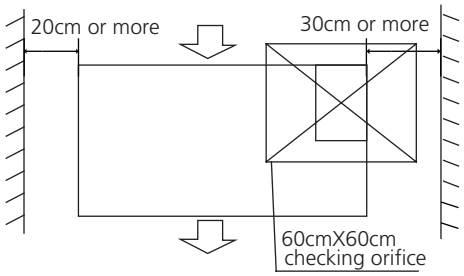
2.5 If the location is exposed to strong winds (for example: near a seaside), the unit must be placed against the wall to shelter it from the wind. If necessary, use an windbreaks (or similar).



DO NOT Strong wind

3. Indoor Unit Installation

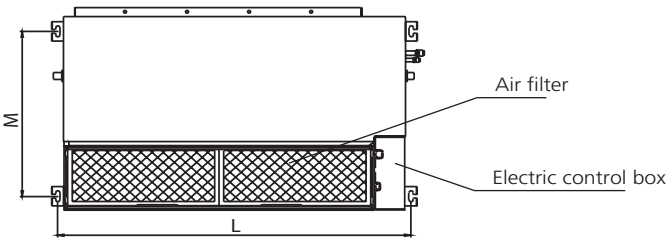
3.1 Service space for indoor unit



3.2 Hang Indoor Unit

1.Please refer to the following diagrams to locate the four positioning screw bolt hole on the ceiling. Be sure to mark the areas where ceiling hook holes will be drilled.

For A6 Duct,



Model	Size of mounted plug	
	L	M
35M	920	508

2. Install and fit pipes and wires after you have finished installing the main body. When choosing where to start, determine the direction of the pipes to be drawn out.

Especially in cases where there is a ceiling involved, align the refrigerant pipes, drain pipes, and indoor and outdoor lines with their connection points before mounting the unit..

3. Install hanging screw bolts.

1) Cut off the roof beam.

2) Strengthen the point at which the cut was made. Consolidate the roof beam..

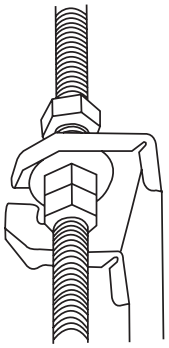
4. After you select an installation location,align the refrigerant pipes, drain pipes, as well as indoor and outdoor wires with their connection points before mounting the unit..

5. Drill 4 holes 10cm (4") deep at the ceiling hook positions in the internal ceiling. Be sure to hold the drill at a 90° angle to the ceiling.

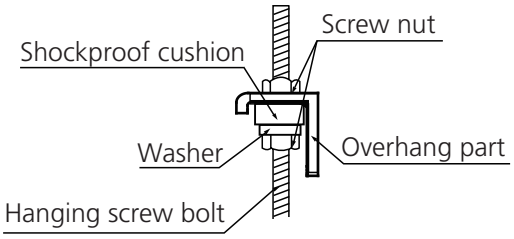
6. Secure the bolt using the included washers and nuts.

7. Install the four suspension bolts.

8. Mount the indoor unit with at least two people to lift and secure it. Insert suspension bolts into the unit's hanging holes. Fasten them using the washers and nuts provided.



9. Mount the indoor unit onto the hanging screw bolts with a block. Position the indoor unit flat using a level indicator to prevent leaks.



Note: Confirm the minimum drain tilt is 1/100 or more.

3.3 Duct and accessories installation

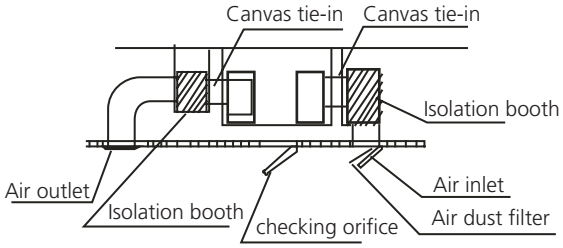
1. Install the filter(optional) according to air inlet size.

2. Install the canvas tie-in between the body and duct.

3. The air inlet and air outlet duct should be far enough apart enough to a avoid air passage short-circuit.

4. Connect the duct according to the following

diagram.



5. Refer to the following static pressure guidelines when installing the indoor unit.

Model	Static Pressure(Pa)
35M	0-100

Change the fan motor static pressure according to external duct static pressure.

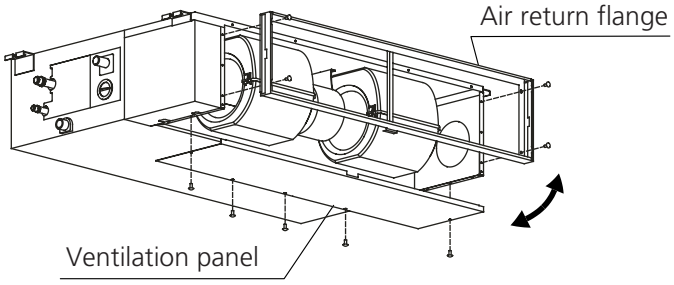
NOTE: 1.Do not put the connecting duct weight on the indoor unit.

2.When connecting duct, use inflammable canvas tie-in to prevent vibrating.

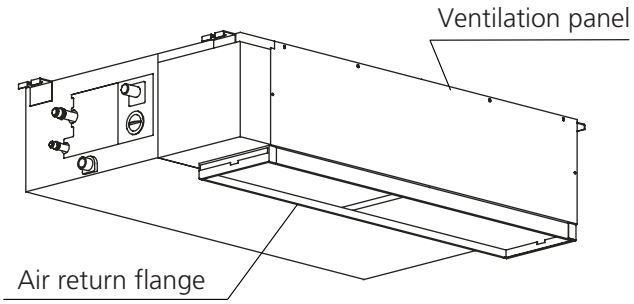
3.Insulation foam must be wrapped outside the duct to avoid condensate. An internal duct underlayer can be added to reduce noise, if the end-user requires.

3.4 Adjust the air inlet direction(From rear side to under-side.)

1. Take off ventilation panel and flange,

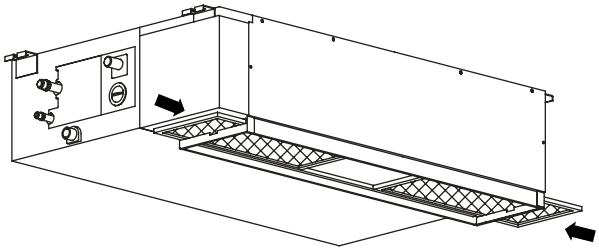


2. Change the mounting positions of ventilation panel and air return flange .



3. When installing the filter mesh, fit it into the

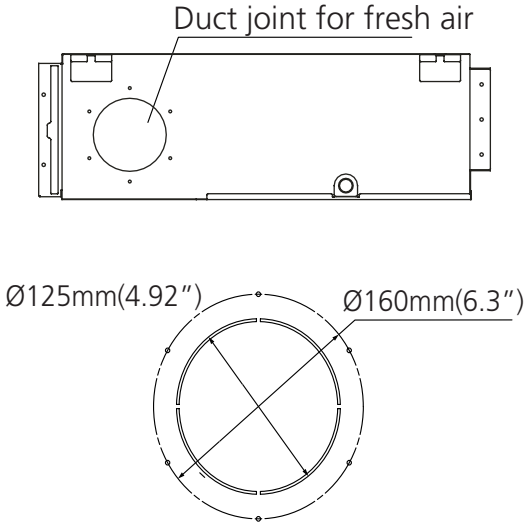
flange as illustrated in the following figure.



NOTE: All the figures in this manual are for demonstration purposes only. The air conditioner you have purchased may be slightly different in design, though similar in shape.

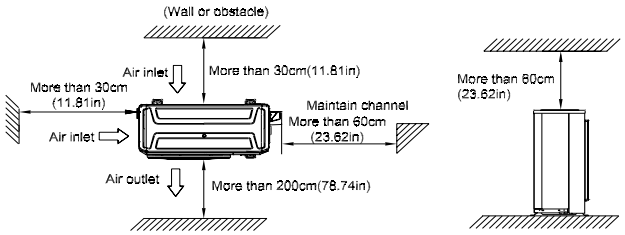
3.5 Fresh air duct installation

Dimension :

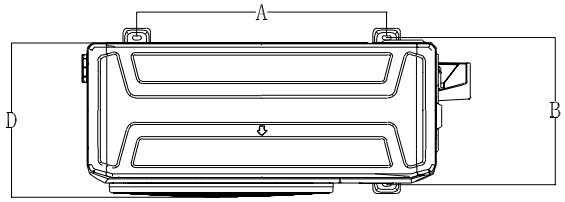


4. Outdoor unit installation(Side Discharge Unit)

4.1 Service space for outdoor unit



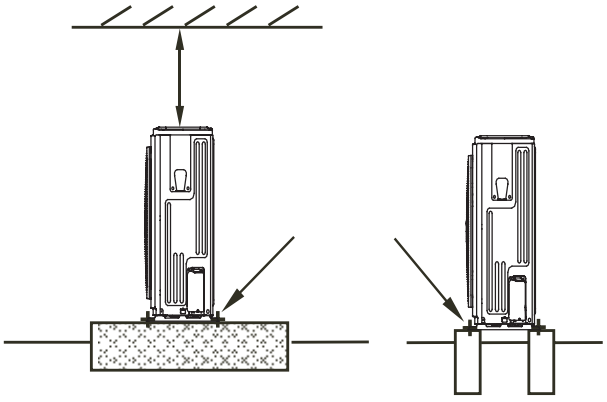
4.2 Bolt pitch



Model	A	B	D
35M	514	340	333

4.3 Install Outdoor Unit

Fix the outdoor unit with anchor bolts(M10)



Cation

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.

Never hold the inlet of the outdoor unit to prevent it from deforming.

Do not touch the fan with hands or other objects.

Do not lean it more than 45, and do not lay it sidelong.

Make concrete foundation according to the specifications of the outdoor units.

Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.

5. Drainage Pipe Installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

5.1 Installation principle

- Ensure at least 1/100 slope of the drainage pipe
- Adopt suitable pipe diameter
- Adopt nearby condensate water discharge

5.2 Key points of drainage water pipe installation

1. Considering the pipeline route and elevation.
   - Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.
2. Drainage pipe selection
   - The drainage pipe diameter shall not small than the drain hose of indoor unit
   - According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

Relationship between water flowrate and capacity of indoor unit

Model	Water flowrate (l/h)
35M	4

According to the above table to calculate the total water flowrate for the confluence pipe selection.

For horizontal drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)		Remark
		Slope 1/50	Slope 1/100	
PVC25	20	39	27	For branch pipe
PVC32	25	70	50	
PVC40	31	125	88	Could be used for confluence pipe
PVC50	40	247	175	
PVC63	51	473	334	

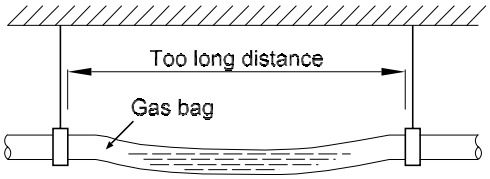
Attention: Adopt PVC40 or bigger pipe to be the main pipe.

For Vertical drainage pipe (The following table is for reference)

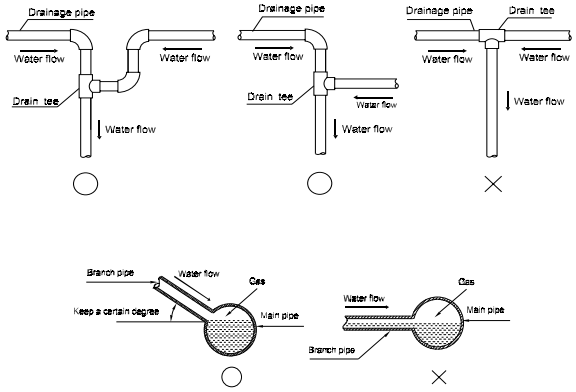
PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)	Remark
PVC25	20	220	For branch pipe
PVC32	25	410	
PVC40	31	730	Could be used for confluence pipe
PVC50	40	1440	
PVC63	51	2760	
PVC75	67	5710	
PVC90	77	8280	

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

3. Individual design of drainage pipe system
   - The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
   - The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.
4. Supporter gap of drainage pipe
   - In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m and 1.5m~2.0m.
   - Each vertical pipe shall be equipped with not less than two hangers.
   - Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.



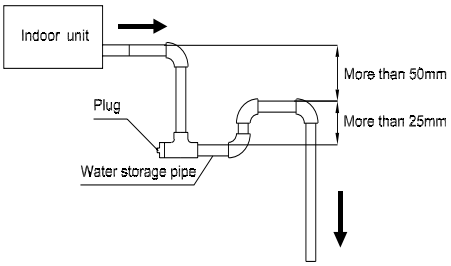
5. The horizontal pipe layout should avoid converse flow or bad flow



- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

6. Water storage pipe setting

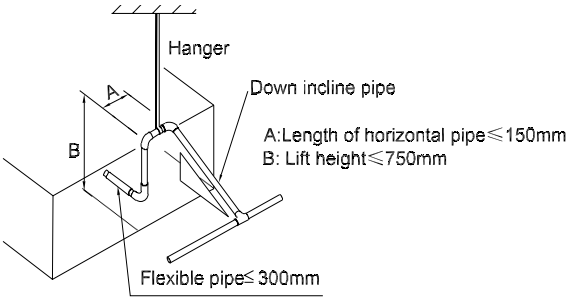
- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit , the water storage pipe should be set to avoid converse flow or blow water phenomena.



7. Lifting pipe setting of indoor unit with water pump

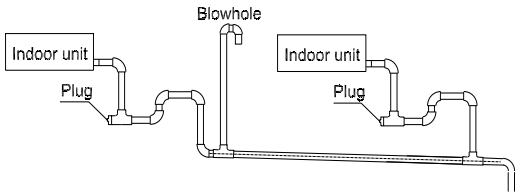
- The length of lifting pipe should not exceed 750mm.
- The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.

- Refer the following picture for installation reference.



8. Blowhole setting

- For the concentrated drainage pipe system, there should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.
- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.



9. The end of drainage pipe shall not contact with ground directly.

5.3 Drainage test

1. Water leakage test

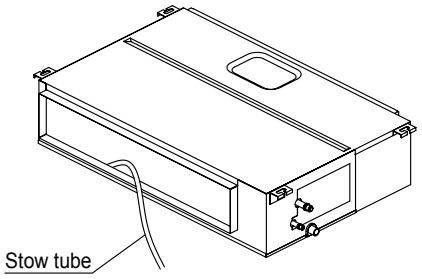
- After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

2. Water discharge test

Check that the drainpipe is unhindered.

This test should be performed on newly built houses before the ceiling is paved.

2.1 Units without a pump

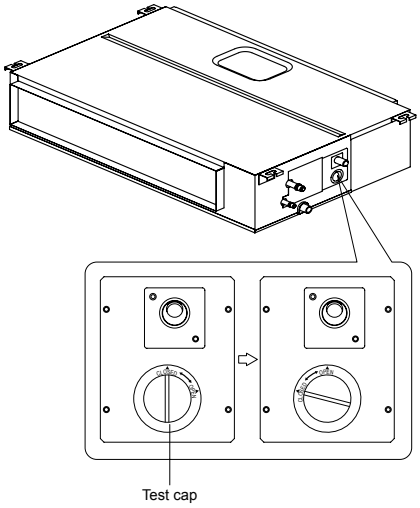


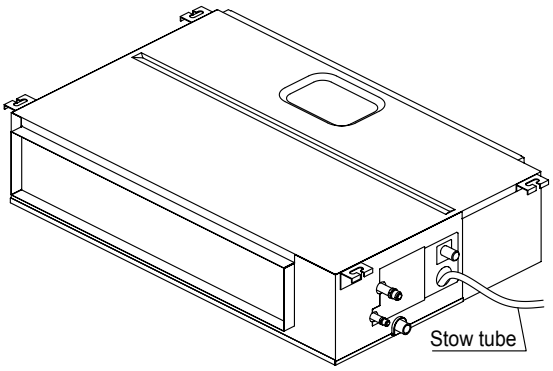
- Fill the water pan with 2 liters of water.
- Check that the drainpipe is unhindered

.2.2 Units with a pump

1. Remove the test cover.

- Fill the water pan with 2 liters of water.





2. Turn on the unit in COOLING mode. You will hear the drain pump.Check whether the water is discharged properly (a 1-minute lag is possible, depending on the length of the drain pipe), Check whether water leaks from the joints.

3. Turn off the air conditioner and put the cap back on.

- After turn off the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and even water shall run over the water collector.
- Continuously infusing water until water level alarmed, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, the normal startup only can be recovered by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

5.4 Insulation work of drainage pipe

Refer the introduction to the insulation engineering parts.

6. Refrigerant Pipe Installation

6.1 Maximum length and drop height

Ensure that the length of the refrigerant pipe, the number of bends, and the drop height between the indoor and outdoor units meets the requirements shown in the following table.

Model	Max. Length (m/ft)	Max. Elevation (m/ft)
35M	30/98.4	20/65.6

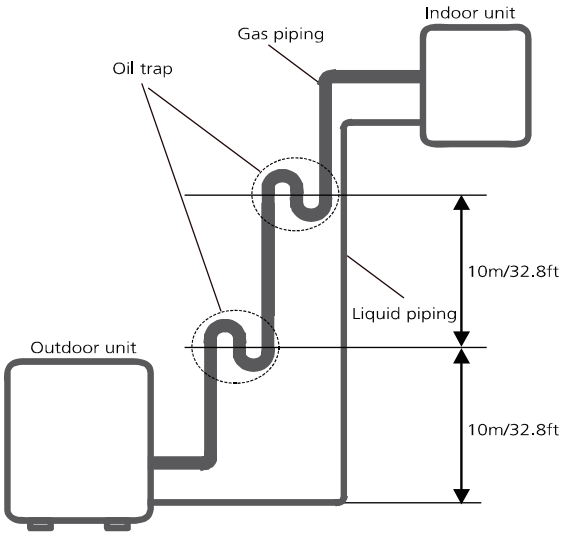
caution:

- The capacity test is based on the standard length and the maximum permissive length is based on the system reliability.
- Oil traps

If the indoor unit is installed higher than the outdoor unit:

-If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas piping can prevent this.

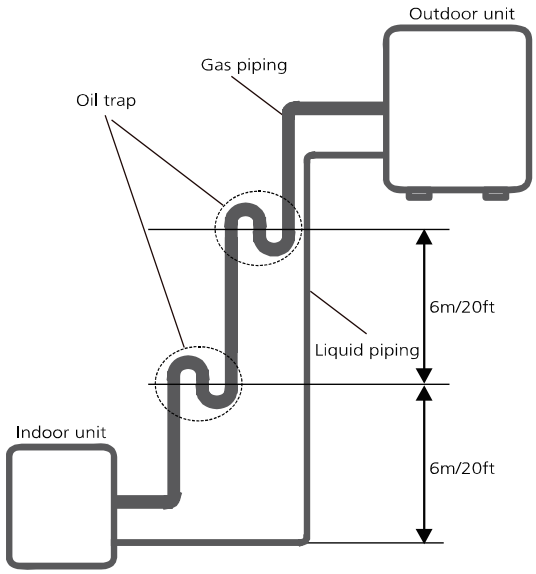
An oil trap should be installed every 10m(32.8ft) of vertical suction line riser.



The indoor unit is installed higher than the outdoor unit

If the outdoor unit is installed higher than the indoor unit:

-It is recommended that vertical suction risers not be upsized. Proper oil return to the compressor should be maintained with suction gas velocity. If velocities drop below 7.62m/s(1500fpm (feet per minute)), oil return will be decreased. An oil trap should be installed every 6m(20ft) of vertical suction line riser.



The outdoor unit is installed higher than the indoor unit.

6.2 The procedure of connecting pipes

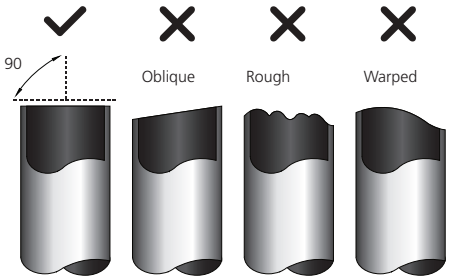
1.Choose the pipe size according to the specification table.

2.Confirm the cross way of the pipes.

3.Measure the necessary pipe length.

4.Cut the selected pipe with pipe cutter

- Make the section flat and smooth.

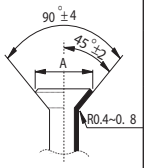


5. Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

6. Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe.

Pipe diameter (inch(mm))	Flare dimension A (mm/inch)		Flare shape
	Min	Max	
1/4" (6.35)	8.4/0.33	8.7/0.34	
3/8" (9.52)	13.2/0.52	13.5/0.53	
1/2" (12.7)	16.2/0.64	16.5/0.65	
5/8" (15.9)	19.2/0.76	19.7/0.78	
3/4" (19)	23.2/0.91	23.7/0.93	
7/8" (22)	26.4/1.04	26.9/1.06	

- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

7. Drill holes if the pipes need to pass the wall.

8. According to the field condition to bend the pipes so that it can pass the wall smoothly.

9. Bind and wrap the wire together with the insulated pipe if necessary.

10. Set the wall conduit

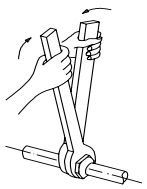
11. Set the supporter for the pipe.

12. Locate the pipe and fix it by supporter

- For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

13. Connect the pipe to indoor unit and outdoor unit by using two spanners.

- Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the bellmouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

Pipe Diameter	Torque	Sketch map
	N.m(lb.ft)	
1/4" (6.35)	15~16 (11~11.8)	
3/8" (9.52)	25~26 (18.4~19.18)	
1/2" (12.7)	35~36 (25.8~26.55)	
5/8" (15.9)	45~47 (33.19~34.67)	
3/4" (19)	65~67 (47.94~49.42)	
7/8" (22)	75-85 (55.3-62.7)	

7. Vacuum Drying and Leakage Checking

7.1 Purpose of vacuum drying

- Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation.

  Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.
- Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

7.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.
- Precision of vacuum pump shall reach 0.02mmHg or above.

7.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

7.3.1 Ordinary vacuum drying

1. When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1hour (vacuum degree of vacuum pump shall be reached -755mmHg).

2. If the vacuum degree of vacuum pump could not reach -755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.

3. If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.

4 . Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

7.3.2 Special vacuum drying

The special vacuum drying method shall be adopted when:

1. Finding moisture during flushing refrigerant pipe.

2. Conducting construction on rainy day, because rain

water might penetrated into pipeline.

3. Construction period is long, and rain water might penetrated into pipeline.

4. Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

1. Vacuum drying for 1 hour.

2. Vacuum damage, filling nitrogen to reach 0.5Kgf/cm2 .

Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.

3. Vacuum drying again for half an hour.

If the pressure reached -755mmHg, start to pressure leakage test. If it cannot reached the value, repeat vacuum damage and vacuum drying again for 1 hour.

4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

8. Additional Refrigerant Charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

Diameter of liquid pipe (mm)	Formula
6.35	V=12g/m×(L-5)
9.52	V=24g/m×(L-5)

V: Additional refrigerant charge volume (g).

L : The length of the liquid pipe (m).

Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

9. Engineering of Insulation

9.1 Insulation of refrigerant pipe

1. Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection→ vacuum drying → insulate the joint parts

2. Purpose of refrigerant pipe insulation

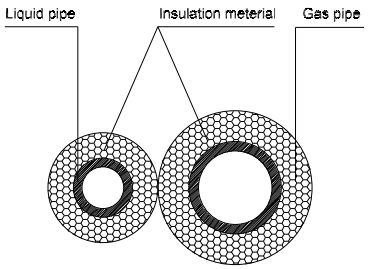
- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of gas pipe is very high (generally 50-100℃) during heating. Insulation work must be carried out to prevent hurt by carelessness touching.

3. Insulation material selection for refrigerant pipe

- The burning performance should over 120℃
- According to the local law to choose insulation materials
- The thickness of insulation layer shall be above 10mm.If in hot or wet environment place, the layer of insulation should be thicker accordingly.

4. Installation highlights of insulation construction

- Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.



- The insulation material at the joint pipe shall be 5~10cm longer than the gap of the insulation material.
- The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
- The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
- The linking part should be use glue to paste together
- Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad insulation and cause easy aging of the material.

9.2 Insulation of drainage pipe

1. Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection→ drainage test→ insulate the joint parts

2. Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and cause leakage to damage the house decoration.

3. Insulation material selection for drainage pipe

- The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.
- Thickness of insulation layer is usually above 10mm.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dew.

4. Installation and highlights of insulation construction

- The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

10. Engineering of Electrical Wiring

10.1 Highlights of electrical wiring installation

- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm gap.
- According to table in indoor part named "the specification of the power" to choose the wiring, make sure the selected wiring not small than the date showing in the table.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.
- There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.
- The wiring with different voltage should not be in one wire tube.
- Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.
- You must first choose the right cable size before preparing it for connection. Be sure to use H07RN-F cables.

Table: Minimum Cross-Sectional Area able of Power and Signal Cables

Rated Current of Appliance (A)	Nominal Cross-Sectional Area(mm^2)
≤ 6	0.75
6 - 10	1
10 - 16	1.5
16 - 25	2.5
25 - 32	4
32 - 45	6

11. Test Operation

11.1 The test operation must be carried out after the entire installation has been completed.

11.2 Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop values are both opened.
- The air conditioner is pre-heated by turning on the power.

11.3 Test operation

1. Open both the liquid and gas stop valves.

2. Turn on the main power switch and allow the unit to warm up.

3. Set the air conditioner to COOL mode, and check the following points.

Indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.

Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.

Drainage Test

a. Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.

b. Remove the test cover. Add 2000ml of water to the tank through the attached tube.

c.Turn on the main power switch and run the air conditioner in COOL mode.

d. Listen to the sound of the drain pump to see if it makes any unusual noises.

e. Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drainpipe.

f. Make sure that there are no leaks in any of the piping.

g. Stop the air conditioner. Turn off the main power switch and reinstall the test cover.

Static Pressure Design

Contents

1. Introduction

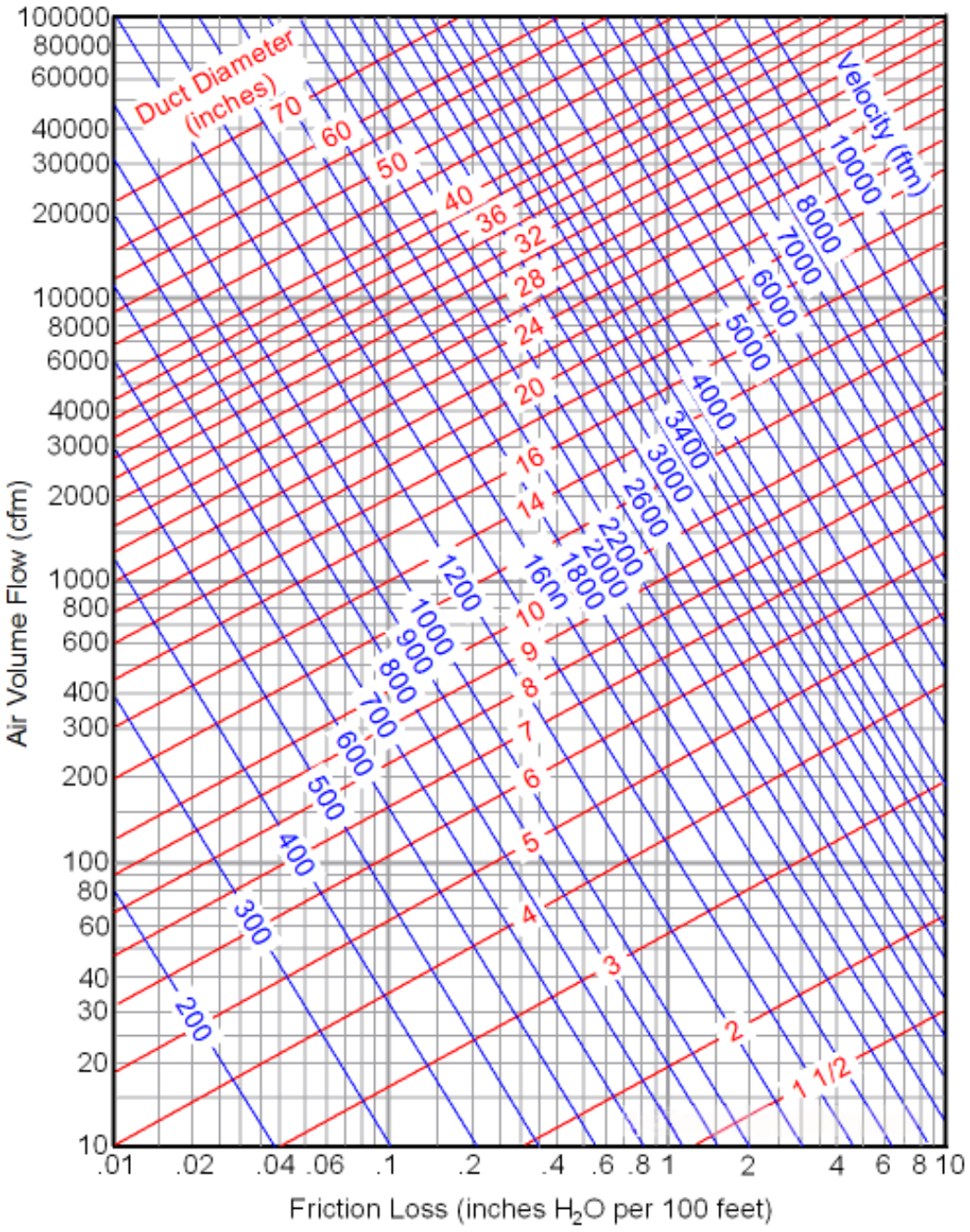
Duct system losses are the irreversible transformation of mechanical energy into heat. The two types of losses are (1) friction losses and (2) dynamic losses.

Friction losses are due to fluid viscosity and result from momentum exchange between molecules (in laminar flow) or between individual particles of adjacent fluid layers moving at different velocities (in turbulent flow). Friction losses occur along the entire duct length.

Dynamic losses result from flow disturbances caused by duct mounted equipment and fittings (e.g., entries, exits, elbows, transitions, and junctions) that change the airflow path's direction or area.

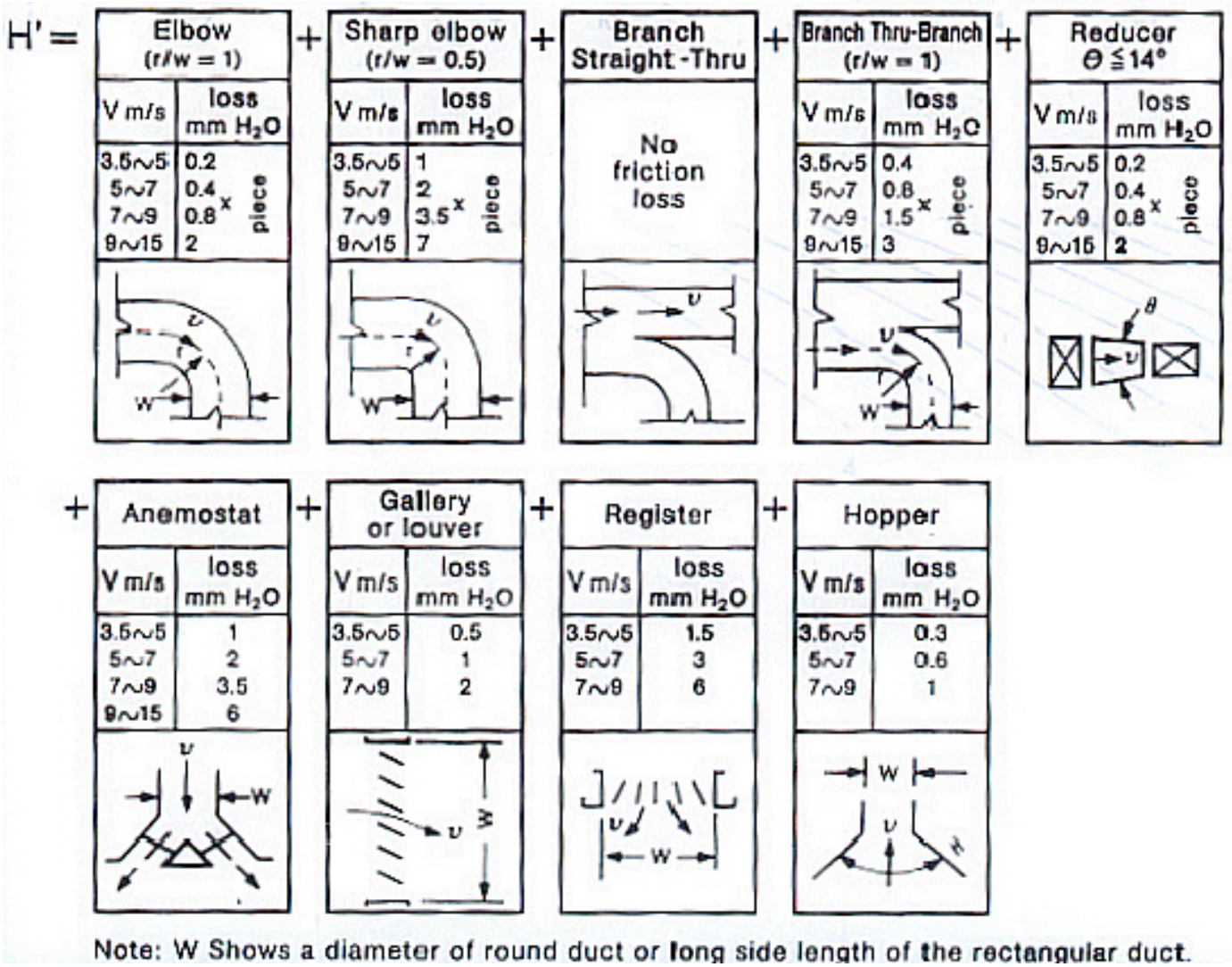
2. Charts For Friction Losses In Round Ducts

Fluid resistance caused by friction in round ducts can be determined by the friction chart. (based on galvanized sheet)



3. Dynamic Losses

For dynamic losses, please refer to below image.



Note: W Shows a diameter of round duct or long side length of the rectangular duct.

4. Corresponding Relation Between Rectangular Duct and Round Duct

Circular Duct Diameter, in.	Length of One Side of Rectangular Duct a, in.																			
	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30	32	34	36
	Length Adjacent Side of Rectangular Duct b, in.																			
5	5																			
5.5	6	5																		
6	8	6																		
6.5	9	7	6																	
7	11	8	7																	
7.5	13	10	8	7																
8	15	11	9	8																
8.5	17	13	10	9																
9	20	15	12	10	8															
9.5	22	17	13	11	9															
10	25	19	15	12	10	9														
10.5	29	21	16	14	12	10														
11	32	23	18	15	13	11	10													
11.5		26	20	17	14	12	11													
12		29	22	18	15	13	12													
12.5		32	24	20	17	15	13													
13		35	27	22	18	16	14	12												
13.5		38	29	24	20	17	15	13												
14			32	26	22	19	17	14												
14.5			35	28	24	20	18	15												
15			38	30	25	22	19	16	14											
16			45	36	30	25	22	18	15											
17				41	34	29	25	20	17	16										
18				47	39	33	29	23	19	17										
19				54	44	38	33	26	22	19	18									
20					50	43	37	29	24	21	19									
21					57	48	41	33	27	23	20									
22					64	54	46	36	30	26	23	20								
23						60	51	40	33	28	25	22								
24						66	57	44	36	31	27	24	22							
25							63	49	40	34	29	26	24							
26							69	54	44	37	32	28	26	24						
27							76	59	48	40	35	31	28	25						
28								64	52	43	38	33	30	27	26					
29								70	56	47	41	36	32	29	27					
30								76	61	51	44	39	35	31	29	28				
31								82	66	55	47	41	37	34	31	29				
32								89	71	59	51	44	40	36	33	31				
33								96	76	64	54	48	42	38	35	33	30			
34									82	68	58	51	45	41	37	35	32			
35									88	73	62	54	48	44	40	37	34	32		
36									95	78	67	58	51	46	42	39	36	34		
37									101	83	71	62	55	49	45	41	38	36	34	
38									108	89	76	66	58	52	47	44	40	38	36	
39										95	80	70	62	55	50	46	43	40	37	36
40										101	85	74	65	58	53	49	45	42	39	37
41										107	91	78	69	62	56	51	47	44	41	39
42										114	96	83	73	65	59	54	50	46	44	41
43										120	102	88	77	69	62	57	53	49	46	43
44											107	93	81	73	66	60	55	51	48	45
45											113	98	86	76	69	63	58	54	50	47
46											120	103	90	80	72	66	61	56	53	49
47											126	108	95	84	76	69	64	59	55	52
48											133	114	100	89	80	73	67	62	58	54
49											140	120	105	93	84	76	70	65	60	56
50											147	126	110	98	88	80	73	68	63	59
51												132	115	102	92	83	76	71	66	61
52												139	121	107	96	87	80	74	69	64
53												145	127	112	100	91	83	77	71	67
54												152	133	117	105	95	87	80	74	70
55													139	123	110	99	91	84	78	72
56													145	128	114	104	95	87	81	75
57													151	134	119	108	98	91	84	78
58													158	139	124	112	102	94	87	81
59													165	145	130	117	107	98	91	85
60													172	151	135	122	111	102	94	88

5. Method For Duct Calculation (equal friction method)

1)Draw schematic view of the duct system.

1)Make notes for air volume and mark clearly the elbow, the branch parts, the air discharge outlet.

1)Select one main ducting route (where the maximum static pressure loss occures).

1)Select the air velocity for the main duct in accordance with the desirable air velocity.

	Typical design velocity (m/s)		
Main duct	Residence	Public building	Factory
	3.5~6.0	5.0~8.0	6.0~11.0

1)Since the velocity and air volume are fixed for main duct, then use the Friction loss chart to find standard friction loss.

1)Use air volume and friction loss to find corresponding duct size and velocity for each part of main duct through Fricitions loss chart.

1)Find the dynamic loss of main ducting route according to the velocity. and type of special fittings (elbows, junctions, regulating flaps, etc.)

1)Obtain the duct size and velocity of each branch duct based on the air volume and the same standard friction loss as for the main duct.

1)Find the dynamic loss of branch duct.

1)Calculate the total pressure loss.

6. Unit Conversion

- 1 inch water=248.8 N/m^2 (Pa)=0.0361 lb/in^2 (psi)=25.4 kg/cm^2=0.0739 in mercury
- 1 ft^3/min (cfm)=1.7 m^3/h
- 1 ft/min=5.08*10-3 m/s
- 1 inch=2.54 cm=0.0254m=0.08333ft

7. Recommended Outlet Velocity For Different Occasion

The permissible sound level and correspondingly maximum air velocity, is determined by the occasion.

Noise / dB(A)	Occasion	Maximum velocity / m/s
25	Studio, recording room	2
35	Cinema, hospital, library	3
40	Office, school, hotel	4
46	Bank, public hall	5
50	Store, post office	6
70	Factory	10

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