

## **Ceiling And Floor Convertible Fan Coil Unit**

Models: MCM 020D/DR  
MCM 025D/DR  
MCM 030D/DR  
MCM 040D/DR  
MCM 050D/DR

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**Note** : Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

**Caution:** Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

**Warning** : Moving machinery and electrical power hazard. May cause severe personal injury or death. Disconnect and lock off power before servicing equipment.

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# Special features

## Ultra Slim New Stylish Design Profile

This unit is contemporary in design and match even the most up to date interior decor. The slim, round profile and compact design of this unit adds a touch of elegance to every decor. No indoor connection pipe and hanger bracket are visible.

## Ceiling And Floor Convertible With Space Saving Installation

This unit is designed for ceiling exposed type and floor exposed type with a very economical and space saving installation. No need renovation to wall or ceiling for ceiling exposed and no foundation work is required for floor exposed installation. This easy to install and ready to operate unit ensure rapid and low installation cost.

## Strong And Robust

The unit is built from strong casing material and robust parts to ensure long lasting reliable service. The drain pan is made from the POLYSTYRENE with a plastic coating on the surface to ensure no leaking and no condensation occur.

## Friendly Serviceability

The air filter, electrical parts, fan and fan motor assembly can all be inspected and replace from bottom of the unit by simply removing the newly designed press in, pull out air intake grille. The POLYSTYRENE drain pan and the heat exchanger coils can remove from the unit easily by remove the bottom panel.

## Microcomputer Remote Controller

The incorporated microprocessor give more accurate control and with the following extra features:

- Fan motor speed can be set at high/medium/low and automatic.
- Timer on/off - the unit can be pre-set to on and off automatically.
- Electronic thermostat - room temperature is precisely controlled resulting in energy saving and increase comfort.
- Sleep mode automatically increase set temperature since room temperature is lower at night thus achieving healthy sleep.

## Wireless Remote Controller

The compact wireless remote controller makes it possible to operate the air conditioner anywhere within the room.

## Auto Or Manual Control On Vertical Airflow Direction

With auto control, the louver will automatically swing up and down to create an excellent air distribution. You can select your desired horizontal air flow direction by adjusting the vertical grille.

# Specifications

## Cooling only

MODEL		INDOOR UNIT	MCM020D	MCM025D	MCM030D	MCM040D		MCM050D		
		OUTDOOR UNIT	MLC020B	MLC025B	MMC030A	MMC040B	MLC040C	MMC050B	MLC050C	
NOMINAL COOLING CAPACITY	kcal/h		5,040	6,300	7,560	10,080	10,080	12,600	12,600	
	W		5,862	7,327	8,792	11,723	11,723	14,654	14,654	
	Btu/h		20,000	25,000	30,000	40,000	40,000	50,000	50,000	
POWER SOURCE		V/Ph/Hz	220 - 240 / 1 / 50							
REFRIGERANT / CONTROL			R22 / CAPILLARY TUBE IN OUTDOOR			R22 / CAPILLARY TUBE IN INDOOR				
FAN	AIR FLOW	cfm/cmm	590 / 16.7	680 / 19.3	740 / 21.0	1,120 / 31.8		1,120 / 31.8		
	FAN MOTOR		4 POLES X 45W	4 POLES X 95W	4 POLES X 95W	4 POLES X 145W		4 POLES X 145W		
	RATED INPUT POWER	W	96	130	132	240		240		
	RATED RUNNING CURRENT	A	0.40	0.58	0.58	1.04		1.04		
COIL	TUBE	MATERIAL	S.B.C			S.I.G.C		S.B.C		S.I.G.C
		DIAMETER	mm/in		9.52 / 3/8					
	THICKNESS	mm/in		0.35 / 0.014						
	FIN	MATERIAL	ALUMINIUM			ALUMINIUM (HYDROPHILIC TYPE)				
		THICKNESS	mm/in		0.11 / 0.0043					
	ROW		3	3	3	4		4		
FIN PER INCH		12	12	12	12		12			
FACE AREA	m <sup>2</sup> /ft <sup>2</sup>	0.19 / 2.06	0.19 / 2.06	0.24 / 2.58	0.36 / 3.95		0.36 / 3.95			
DIMENSION	HEIGHT	mm/in	214 / 8.42	214 / 8.42	249 / 9.80	249 / 9.80		249 / 9.80		
	WIDTH	mm/in	1,214 / 47.80	1,214 / 47.80	1,214 / 47.80	1,714 / 67.40		1,714 / 67.40		
	DEPTH	mm/in	670 / 26.30	670 / 26.30	670 / 26.30	670 / 26.30		670 / 26.30		
WEIGHT	kg	43	43	45	70		70			
CONTROL	ROOM TEMPERATURE		MICROCOMPUTER CONTROLLED THERMOSTAT							
	AIR DISCHARGE OPERATION		AUTOMATIC LOUVER (UP&DOWN) & MANUAL LOUVER (BOTTOM)							
CONDENSATE DRAIN SIZE	mm/in	LCD WIRELESS MICROCOMPUTER REMOTE CONTROL								
AIR FILTER		19.05 / 3/4								
PACKING DIMENSION	HEIGHT	mm/in	301 / 11.9		345 / 13.6	345 / 13.6				
	WIDTH	mm/in	1,311 / 51.6		1,361 / 53.5	1,816 / 71.4				
	DEPTH	mm/in	760 / 29.9		760 / 29.9	760 / 29.9				
POWER SOURCE		V/Ph/Hz	220 - 240 / 1 / 50				380 - 420 / 3 / 50			
COMP.	COMPRESSOR TYPE		ROTARY HERMETIC			RECIPROCATING HERMETIC				
	CAPACITOR	µF	35	45	45	-	-	-	-	
	LOCK ROTOR AMP.	A	47	59	85	45		62		
	RATED RUNNING CURRENT	A	9.9	12.5	13.9	6.3 / 5.8		8.2 / 8.3		
	RATED INPUT POWER	W	2,073	2,761	2,809	3,780	3,486	4,500	4,943	
PROTECTION DEVICE		OVERLOAD PROTECTION			OVERLOAD PROTECTION AND MANUAL RESET HIGH/LOW PRESSURE SWITCH					
FAN	FAN TYPE / DRIVE		PROPELLER / DIRECT							
	BLADE MATERIAL		GLASS REINFORCED ACRYL STYRENE RESIN							
	DIAMETER	mm/in	420.0 / 16.5		355.6 / 14.0	355.6 / 14.0	609.6 / 24.0	406.4 / 16.0	609.6 / 24.0	
	RATED RUNNING CURRENT	A	0.56		2 x 0.28	2 x 0.28	1.09	2 x 0.78		
	RATED OUTPUT POWER	W	55		2 x 30	2 x 30	145	2 x 80		
RATED INPUT POWER	W	133		124	124	241	341	241		
COIL	TUBE	MATERIAL	S.B.C	S.I.G.C	S.B.C					
		DIAMETER	mm/in		9.52 / 3/8					
	THICKNESS	mm/in		0.35 / 0.014	0.36 / 0.014 AVERAGE		0.35 / 0.014			
	FIN	MATERIAL	ALUMINIUM (SLIT TYPE)			ALUMINIUM				
		THICKNESS	mm/in		0.127 / 0.005					
	ROW		2		3	2	2	3	2	
FIN PER INCH		14		14	14	16	14	16		
FACE AREA	m <sup>2</sup> /ft <sup>2</sup>	0.51 / 5.53		0.55 / 6.00	0.77 / 8.29	0.87 / 9.33	0.77 / 8.29	0.87 / 9.33		
DIMENSION	HEIGHT	mm/in	646 / 25.40	991 / 39.00	1094 / 43.07	850 / 33.46	1094 / 43.07	850 / 33.46		
	WIDTH	mm/in	840 / 33.10	772 / 30.40	960 / 37.79	1029 / 40.53	960 / 37.79	1029 / 40.53		
	DEPTH	mm/in	330 / 13.00	400 / 15.75	437 / 17.20	400 / 15.75	437 / 17.20	400 / 15.75		
WEIGHT	kg	57	58	90	95	100	112	105		
CASING	MATERIAL		GALVANISED MILD STEEL							
	THICKNESS	mm/in	0.8 / 0.031							
	FINISHING		POLYESTER POWDER							
PIPE	TYPE		FLARE VALVE							
		SIZE	LIQUID	mm/in		9.52 / 3/8		9.52 / 3/8		
		GAS	mm/in		15.88 / 5/8		19.05 / 3/4			
PACKING DIMENSION	HEIGHT	mm/in	710 / 27.95		1,183 / 46.57	1,265 / 49.80	1,000 / 39.37	1,265 / 49.80	1,000 / 39.37	
	WIDTH	mm/in	957 / 37.68		904 / 35.59	1,084 / 42.68	1,200 / 47.24	1,084 / 42.68	1,200 / 47.24	
	DEPTH	mm/in	461 / 18.15		588 / 23.15	641 / 25.24	560 / 22.05	641 / 25.24	560 / 22.05	

1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.

2) ALL UNITS ARE BEING TESTED AND COMPLY TO ARI 210/240-89

3) NOMINAL COOLING AND HEATING CAPACITY ARE BASED ON THE CONDITIONS BELOW :

a) COOLING - 26.7°C DB / 19.4°C WB INDOOR AND 35°C DB OUTDOOR

b) HEATING - 21.1°C DB / 15.6°C WB INDOOR AND 8.3°C DB / 6.1°C WB OUTDOOR

### Abbreviation

S.B.C. - SEAMLESS BARE COPPER

S.I.G.C. - SEAMLESS INNER GROOVE COPPER

# Heat Pump

MODEL	INDOOR UNIT	MCM020DR	MCM025DR	MCM030DR	MCM040DR	MCM050DR	
	OUTDOOR UNIT	MLC020BR	MLC025BR	MLC030CR	MLC040CR	MLC050CR	
NOMINAL COOLING CAPACITY	kcal/h	5,040	6,048	7,560	10,080	12,096	
	W	5,862	7,034	8,792	11,723	14,068	
NOMINAL HEATING CAPACITY	Btu/h	20,000	24,000	30,000	40,000	48,000	
	kcal/h	5,292	6,300	8,064	10,332	12,096	
HEATING CAPACITY	W	6,155	7,327	9,379	12,016	14,068	
	Btu/h	21,000	25,000	32,000	41,000	48,000	
POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50					
REFRIGERANT / CONTROL		R22 / CAPILLARY TUBE IN OUTDOOR		R22 / CAPILLARY TUBE & TXV IN OUTDOOR			
FAN	AIR FLOW	cfm/cmm	590 / 16.7	680 / 19.3	740 / 21.0	1,120 / 31.8	1,120 / 31.8
	FAN MOTOR		4 POLES X 45W	4 POLES X 95W	4 POLES X 95W	4 POLES X 145W	4 POLES X 145W
	RATED INPUT POWER	W	96	130	132	240	240
	RATED RUNNING CURRENT	A	0.40	0.58	0.58	1.04	1.04
COIL	TUBE	MATERIAL	S.B.C		S.I.G.C	S.B.C	S.I.G.C
		DIAMETER	9.52 / 3/8				
	THICKNESS	0.35 / 0.014					
	FIN	MATERIAL	ALUMINIUM			ALUMINIUM (HYDROPHILIC TYPE)	
		THICKNESS	0.11 / 0.0043				
	ROW		3	3	3	4	4
FIN PER INCH		12	12	12	12	12	
FACE AREA	m <sup>2</sup> /ft <sup>2</sup>	0.19 / 2.06	0.19 / 2.06	0.24 / 2.58	0.36 3.95	0.36 3.95	
DIMENSION	HEIGHT	mm/in	214 / 8.42	214 / 8.42	249 / 9.80	249 / 9.80	249 / 9.80
	WIDTH	mm/in	1,214 / 47.80	1,214 / 47.80	1,214 / 47.80	1,714 / 67.40	1,714 / 67.40
	DEPTH	mm/in	670 / 26.30	670 / 26.30	670 / 26.30	670 / 26.30	670 / 26.30
WEIGHT	kg	43	43	45	70	70	
CONTROL	ROOM TEMPERATURE	MICROCOMPUTER CONTROLLED THERMOSTAT					
	AIR DISCHARGE OPERATION	AUTOMATIC LOUVER (UP&DOWN) & MANUAL LOUVER (BOTTOM)					
		LCD WIRELESS MICROCOMPUTER REMOTE CONTROL					
CONDENSATE DRAIN SIZE	mm/in	19.05 / 3/4					
AIR FILTER		WASHABLE SARAN NET (OPTIONAL IONIZER FILTER)					
PACKING DIMENSION	HEIGHT	mm/in	301 / 11.9		345 / 13.6	345 / 13.6	
	WIDTH	mm/in	1,311 / 51.6		1,361 / 53.5	1,816 / 71.4	
	DEPTH	mm/in	760 / 29.9		760 / 29.9	760 / 29.9	
POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50			380 - 420 / 3 / 50		
COMP	COMPRESSOR TYPE		ROTARY HERMETIC		RECIPROCATING HERMETIC		
	CAPACITOR	µF	35	45	45	-	
	LOCK ROTOR AMP.	A	49.0	56.5	78.0	45.0	62.0
	RATED RUNNING CURRENT (COOLING)	A	11.0	13.3	13.4	6.0	7.6
	RATED RUNNING CURRENT (HEATING)	A	9.7	13.6	12.9	5.4	7.0
	RATED INPUT POWER (COOLING)	W	2,040	2,667	2,643	3,431	4,480
	RATED INPUT POWER (HEATING)	W	2,140	2,757	2,562	2,921	3,902
	PROTECTION DEVICE		OVERLOAD PROTECTION		OVERLOAD PROTECTION AND MANUAL RESET HIGH/LOW PRESSURE SWITCH		
FAN	FAN TYPE / DRIVE		PROPELLER / DIRECT				
	BLADE MATERIAL		GLASS REINFORCED ACRYL STYRENE RESIN				
	DIAMETER	mm/in	420.0 / 16.5		609.6 / 24.0		
	RATED RUNNING CURRENT	A	0.56		1.09	1.09	2.7
	RATED OUTPUT POWER	W	55		145	145	460
RATED INPUT POWER	W	133		241	241	635	
COIL	TUBE	MATERIAL	S.B.C	S.I.G.C	S.B.C		
		DIAMETER	9.52 / 3/8				
	THICKNESS	mm/in	0.35 / 0.014	0.36 / 0.014 AVERAGE	0.35 / 0.014	0.35 / 0.014	
	FIN	MATERIAL	ALUMINIUM (SLIT TYPE)			ALUMINIUM	
		THICKNESS	mm/in	0.127 / 0.005			
	ROW		2		2		
FIN PER INCH		14		16			
FACE AREA	m <sup>2</sup> /ft <sup>2</sup>	0.51 / 5.53		0.87 / 9.33			
DIMENSION	HEIGHT	mm/in	646 / 25.40		850 / 33.46		
	WIDTH	mm/in	840 / 33.10		1029 / 40.53		
	DEPTH	mm/in	330 / 13.00		400 / 15.75		
WEIGHT	kg	57	58	98	110	115	
CASING	MATERIAL	GALVANISED MILD STEEL					
	THICKNESS	mm/in	0.8 / 0.031				
	FINISHING	POLYESTER POWDER					
PIPE	TYPE		FLARE VALVE				
		SIZE	LIQUID	mm/in	6.35 / 1/4	9.52 / 3/8	9.52 / 3/8
	GAS	mm/in	15.88 / 5/8	15.88 / 5/8	19.05 / 3/4		
PACKING DIMENSION	HEIGHT	mm/in	710 / 27.95		1,000 / 39.37		
	WIDTH	mm/in	957 / 37.68		1,200 / 47.24		
	DEPTH	mm/in	461 / 18.15		560 / 22.05		

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b) HEATING - 21.1°C DB / 15.6°C WB INDOOR AND 8.3°C DB / 6.1°C WB OUTDOOR

### Abbreviation

S.B.C - SEAMLESS BARE COPPER

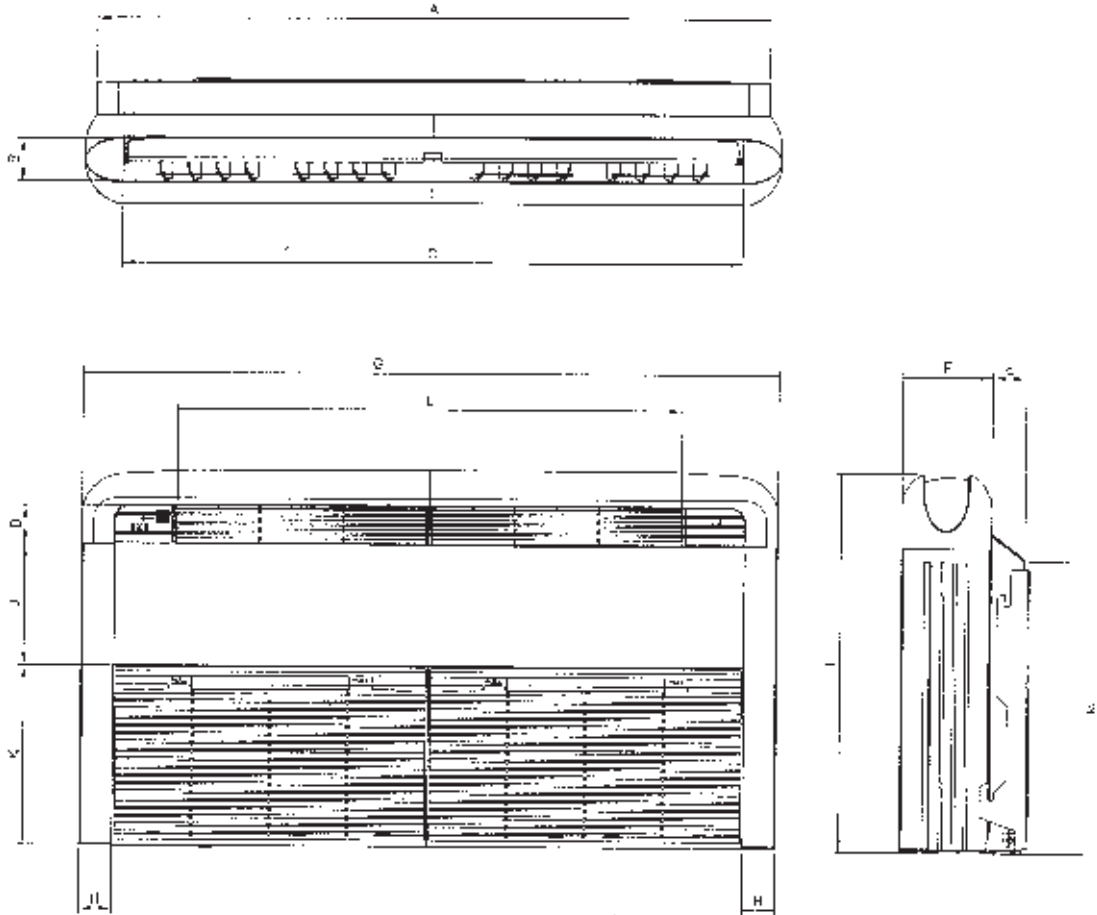
S.I.G.C - SEAMLESS INNER GROOVE COPPER

# Outlines and dimensions

Indoor Unit

Model: MCM - D SERIES

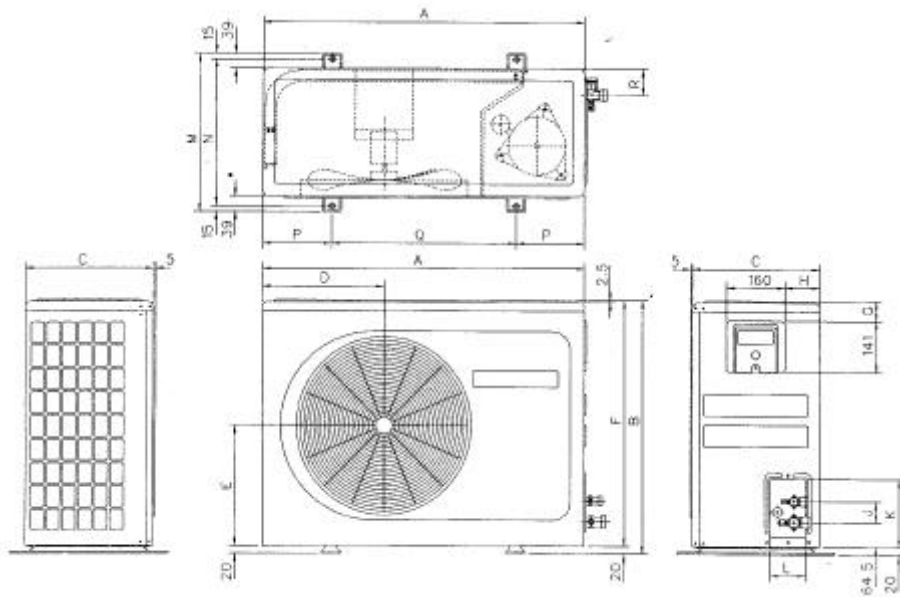
(Cooling only and heat pump)



MODEL	MCM 020D/DR	MCM 025D/DR	MCM 030D/DR	MCM 040D/DR	MCM 050D/DR
A	1174	1174	1174	1674	1674
B	75	75	75	75	75
C	1082	1082	1082	1582	1582
D	68	68	68	68	68
E	58	58	93	93	93
F	156	156	156	156	156
G	1214	1214	1214	1714	1714
H	57	57	57	57	57
I	670	670	670	670	670
J	216	216	216	216	216
K	319	319	319	319	319
L	879	879	879	1379	1379
M	517	517	517	517	517

All dimensions in mm

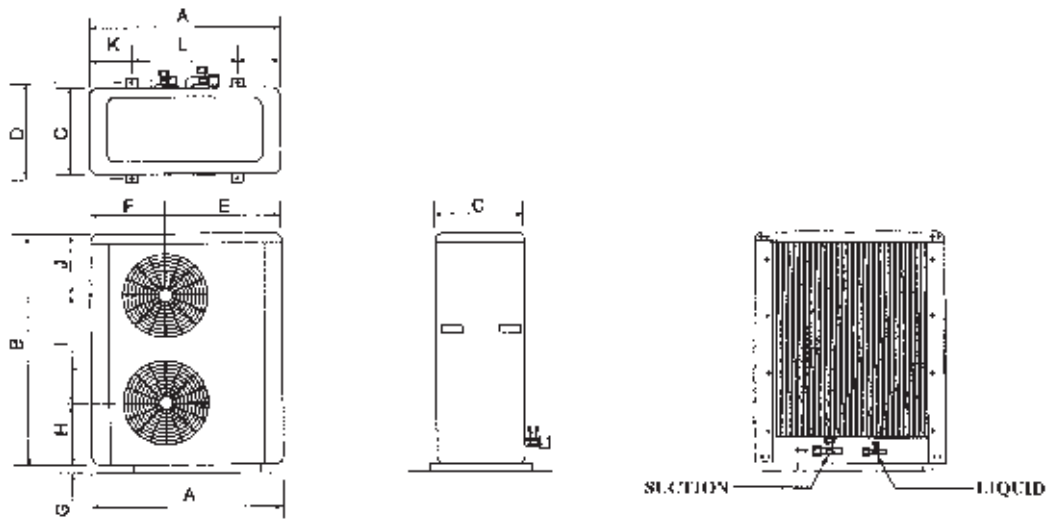
**Outdoor unit**  
**Model: MLC - B SERIES**



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
MLC 020B / BR	840	646	330	297	309	626	46	90	64	177	106	408	378	124	492	78.5
MLC 025B / BR	840	646	330	297	309	626	46	90	64	177	106	408	378	124	492	78.5

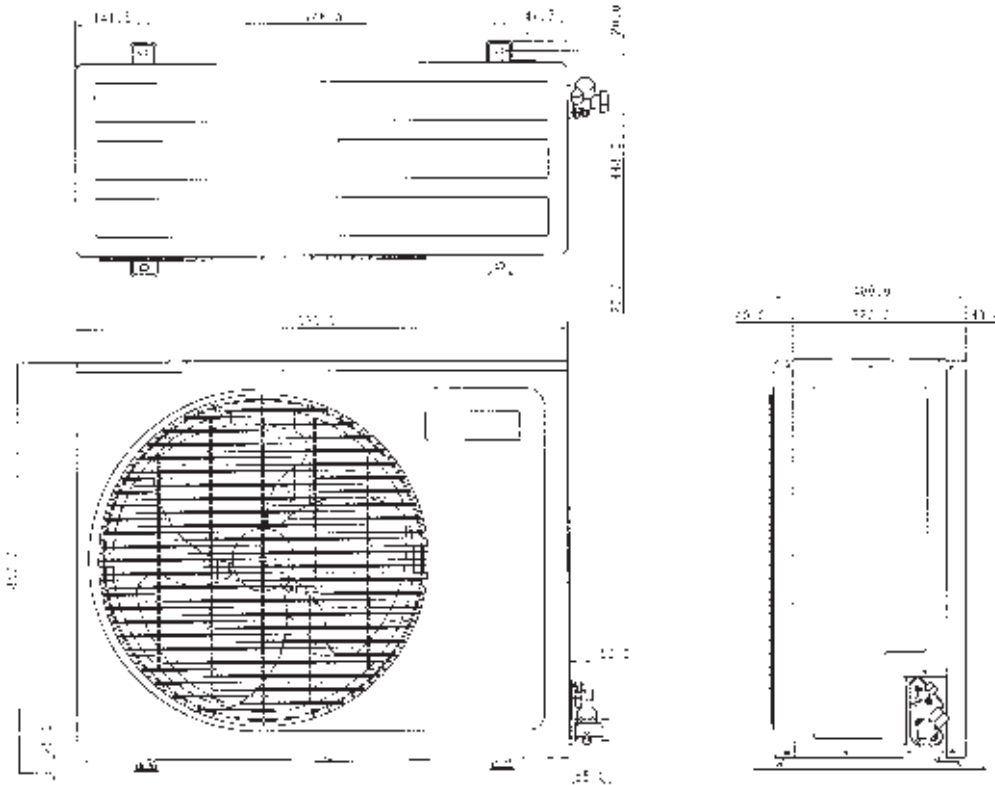
All dimensions in mm


**Model: MMC SERIES**



MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M
MMC 030A	772	991	400	414	492	280	25	284	441	240	127	518	127
MMC 040B	960	1095	437	470	622	338	20	305	492	277	106	748	106
MMC 050B	960	1095	437	470	622	338	20	305	492	277	106	748	106

All dimensions in mm

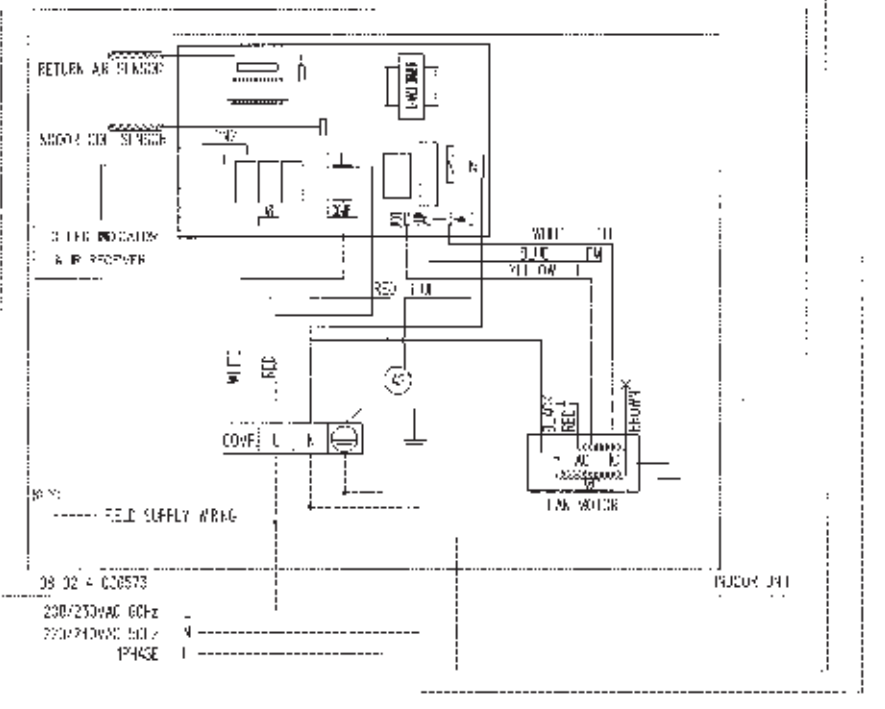
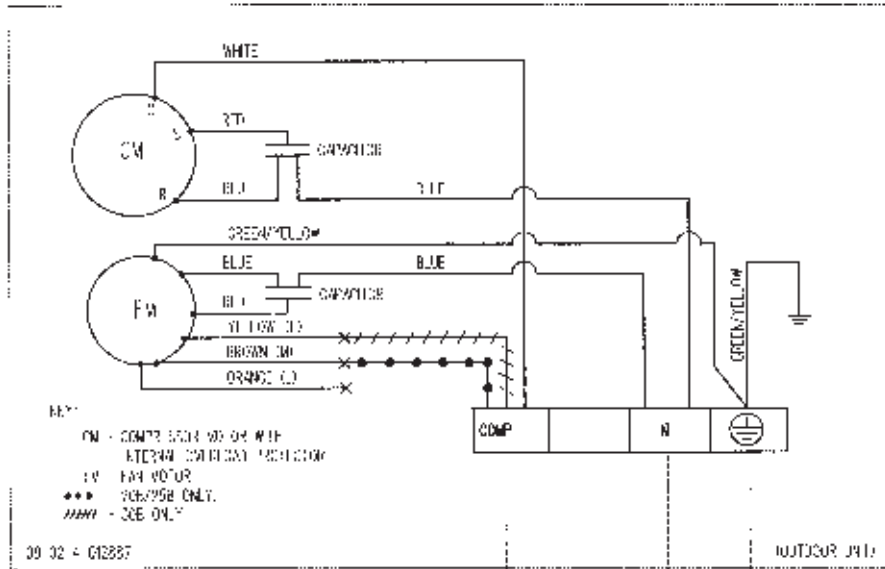


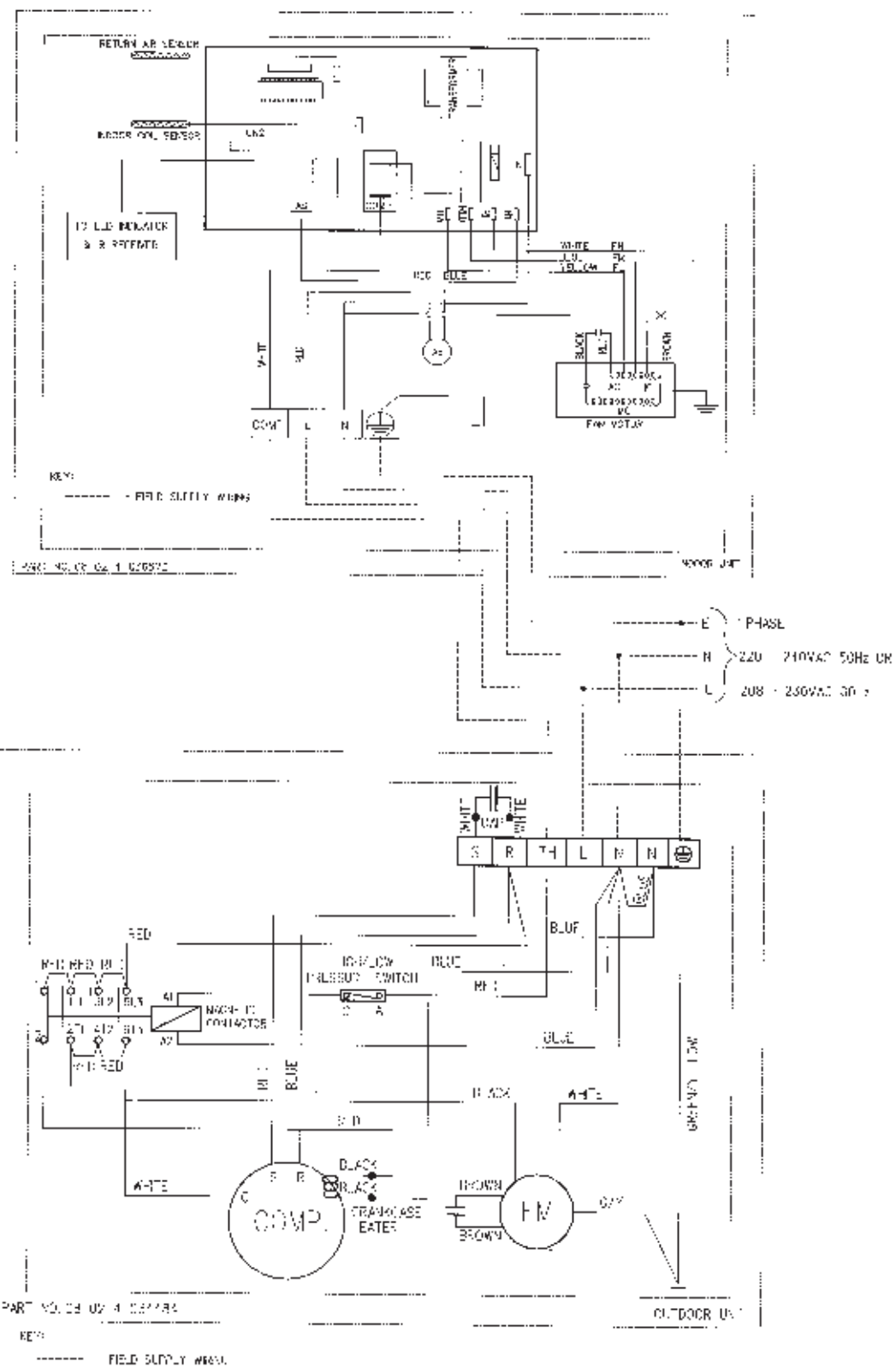
 **Caution** Sharp edges and coil surfaces are potential locations which may cause injury hazards. Avoid from being in contact with these places.

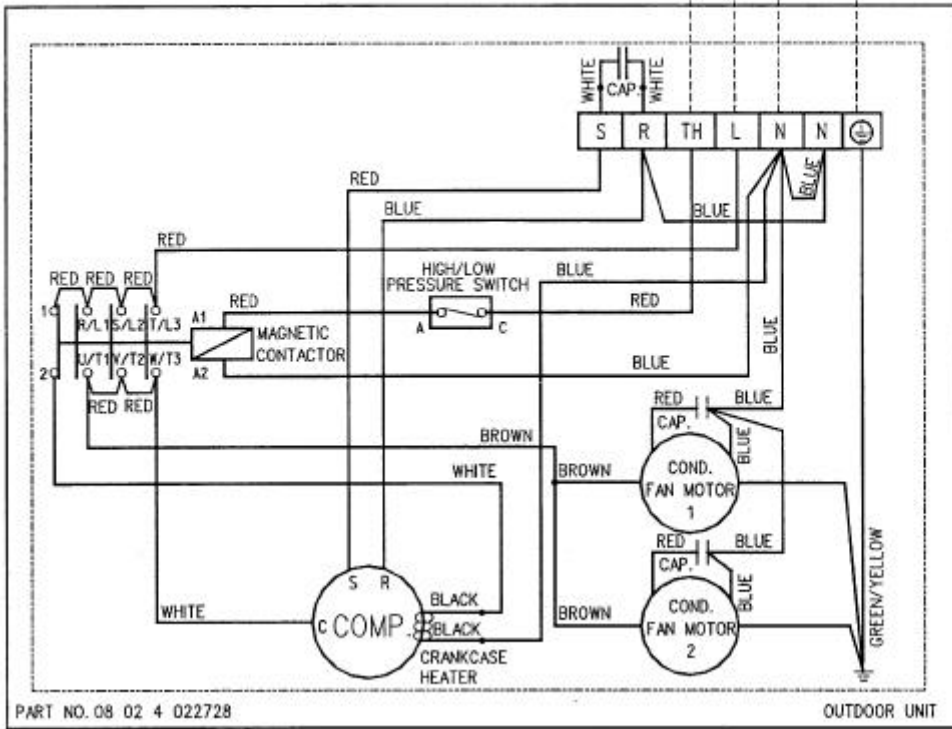
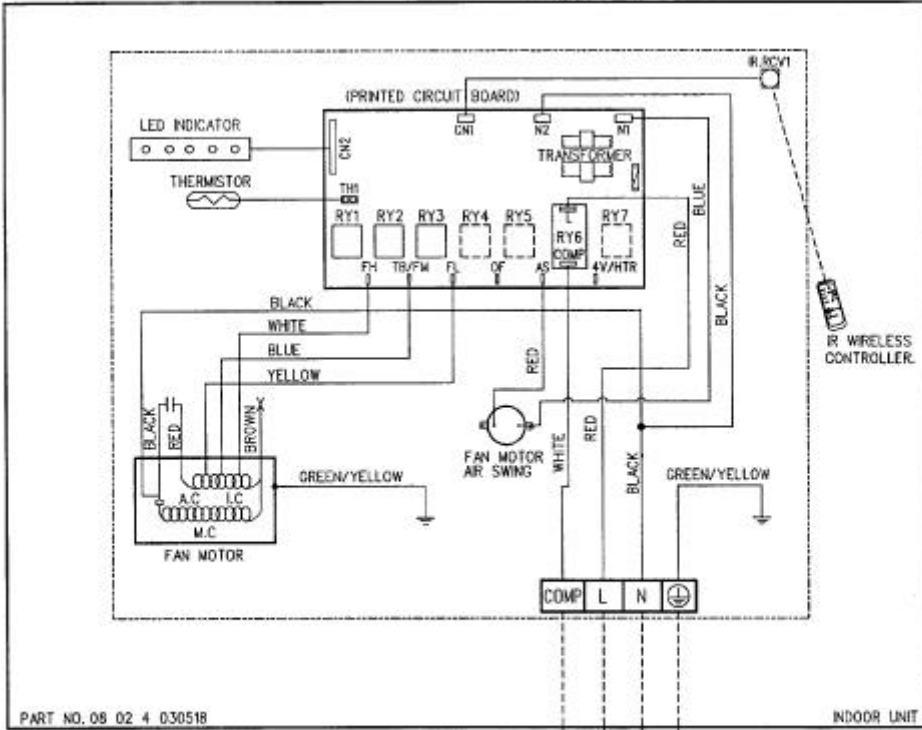


# Wiring diagrams

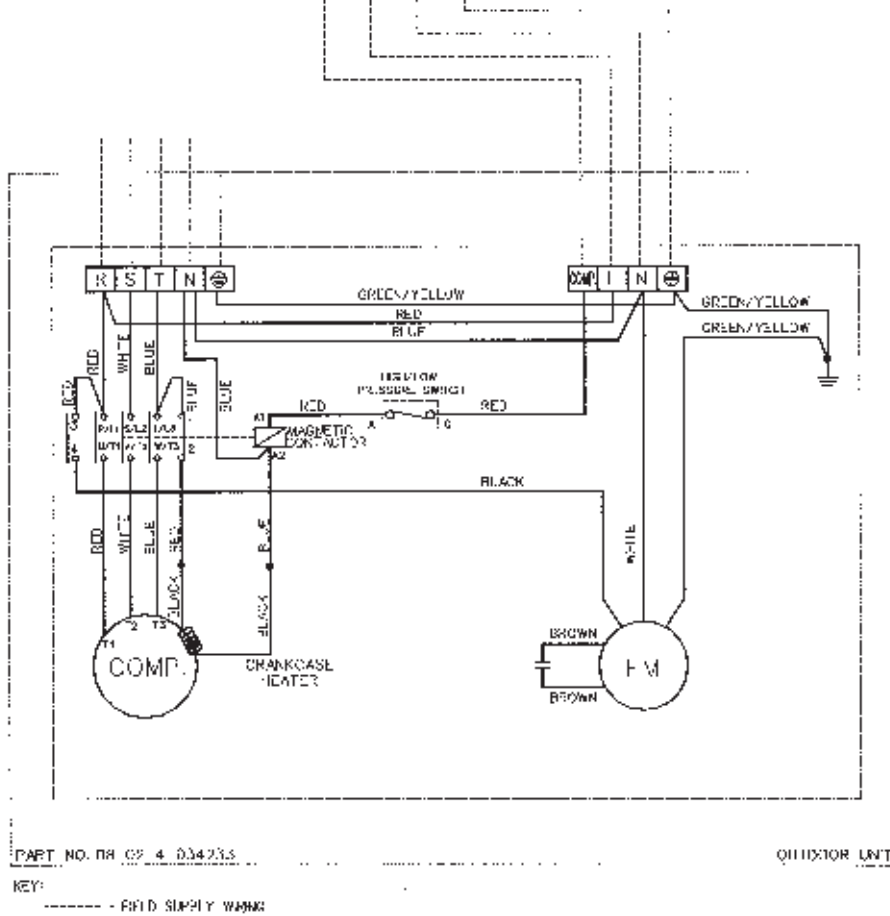
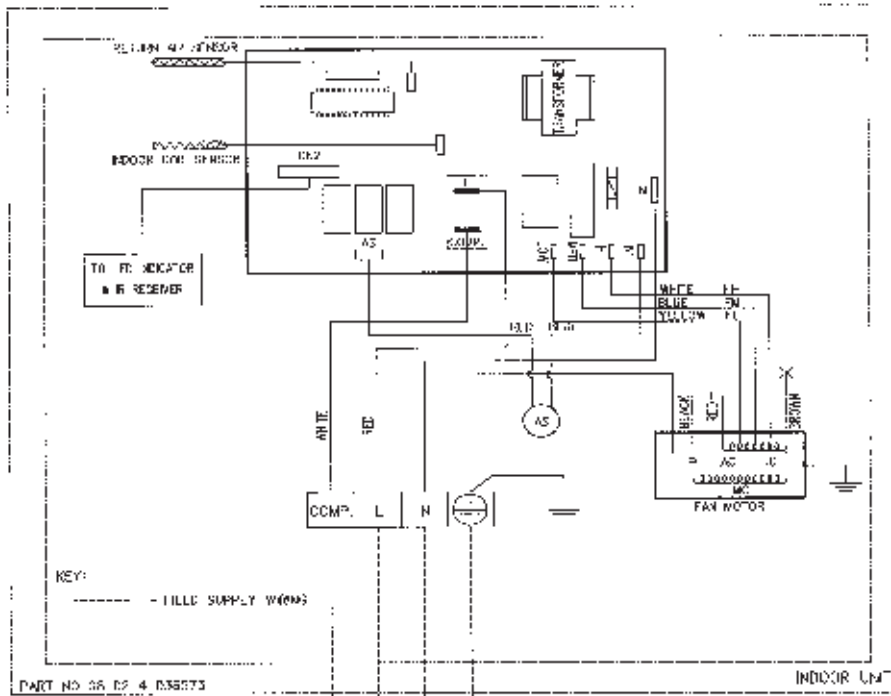
Model : MCM 020/025D - MLC 020/025B

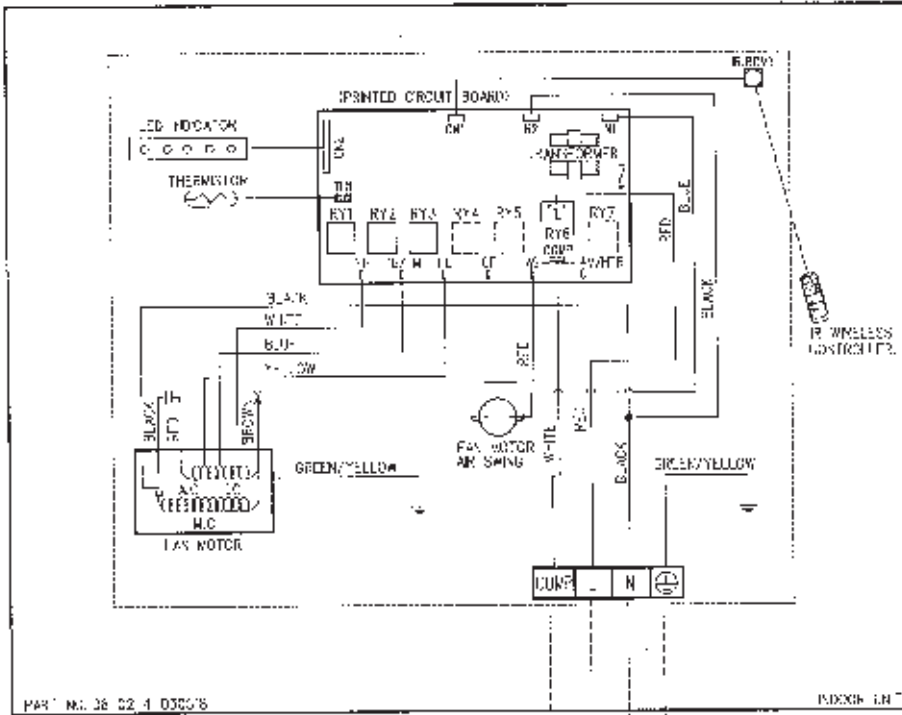




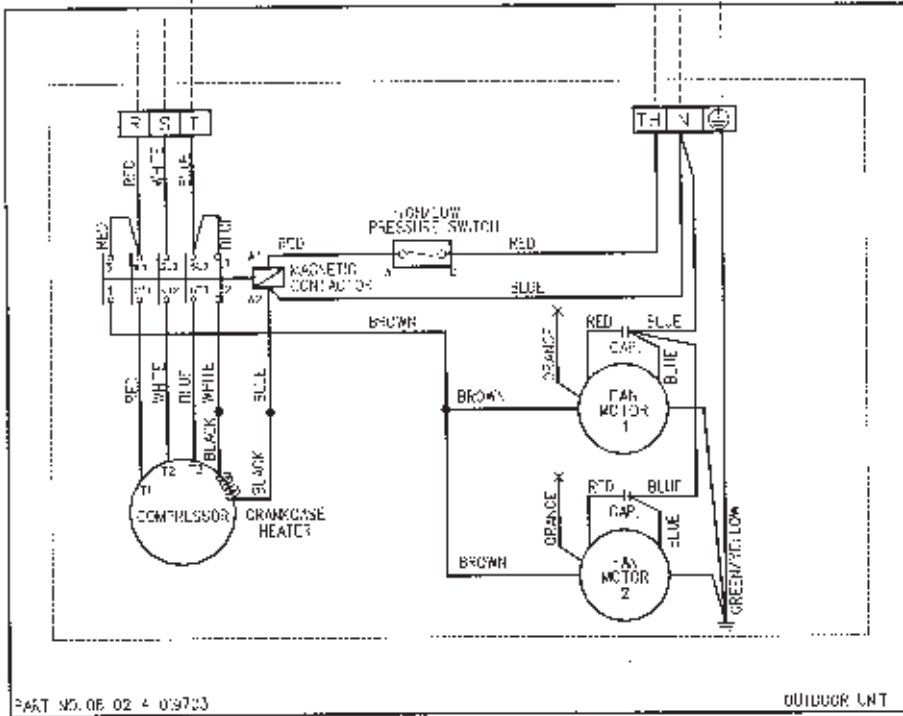


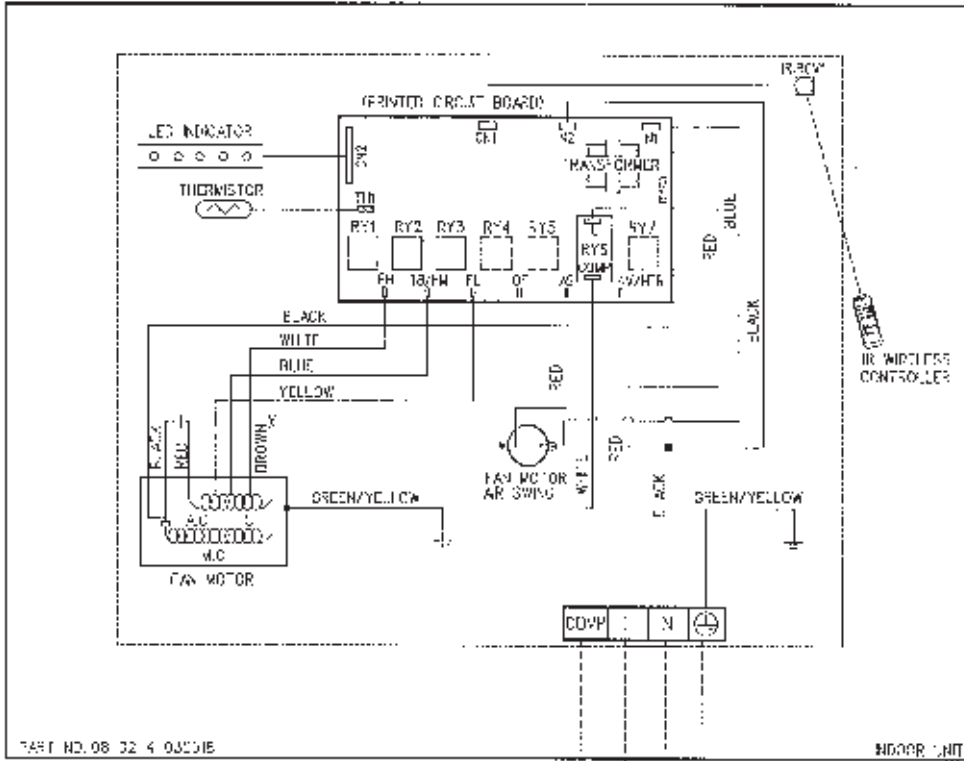
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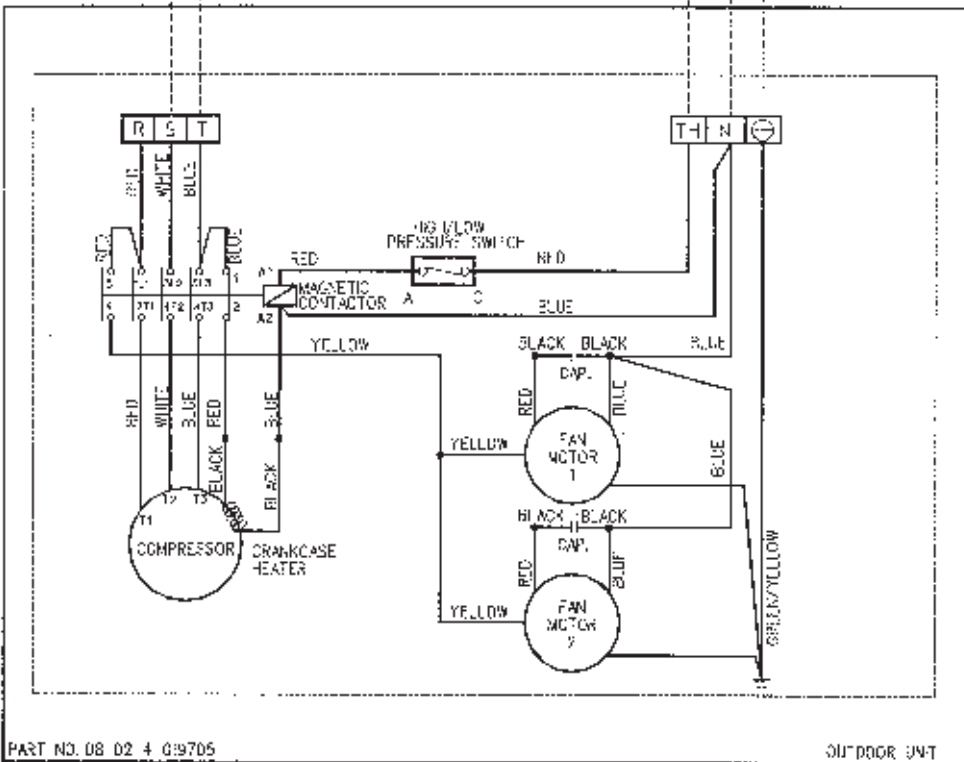


- E } 220 - 240V
- N } 17-4
- L } 50Hz
- X } 4AC - 415V
- S } 3PH
- T } 50Hz

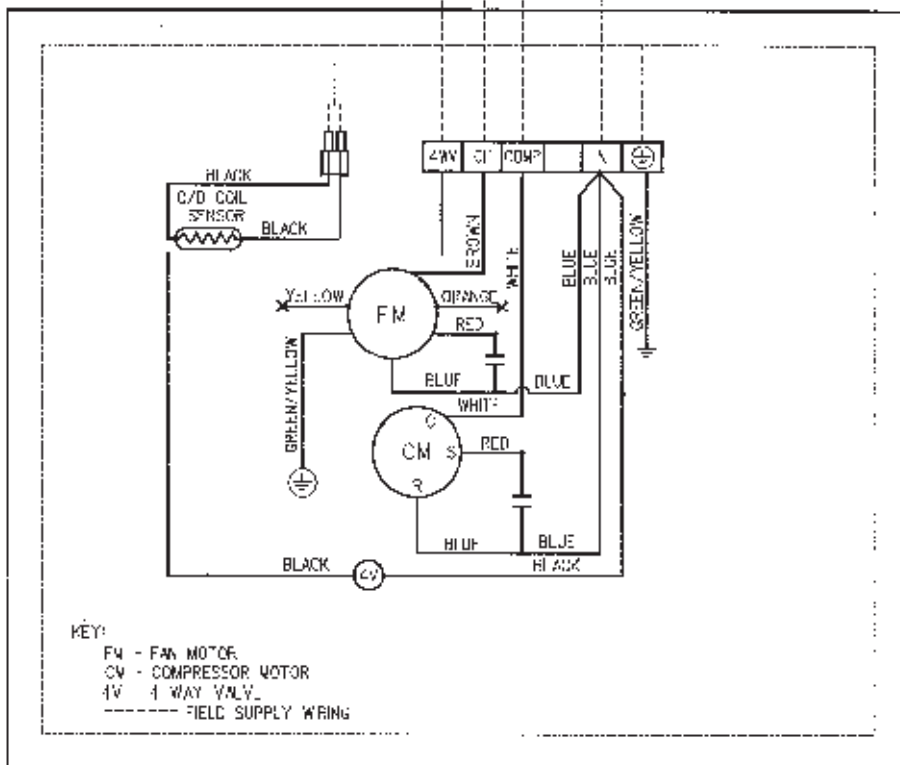
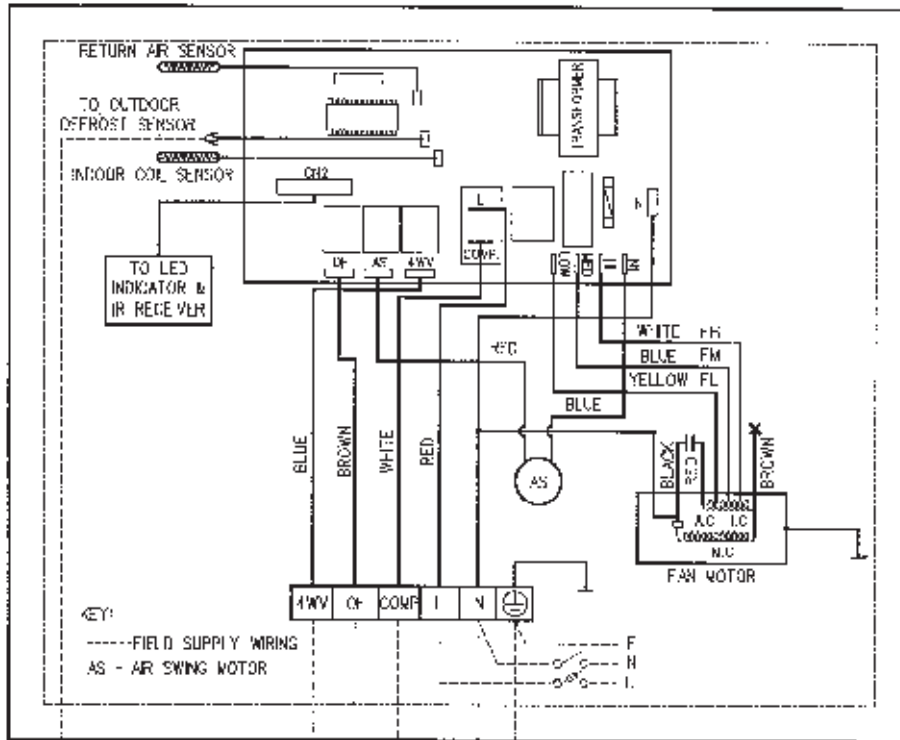


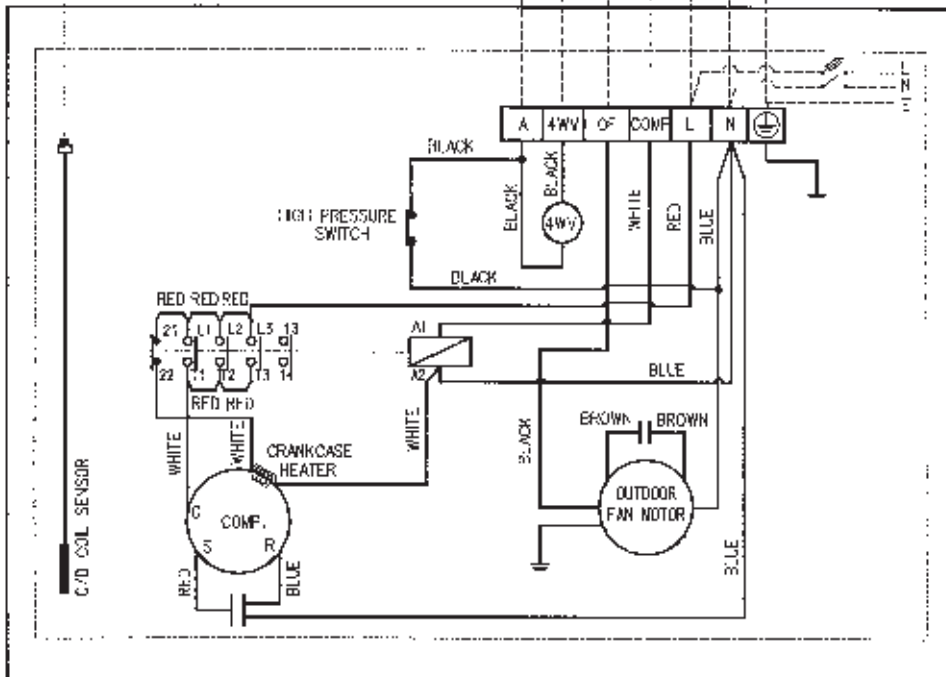
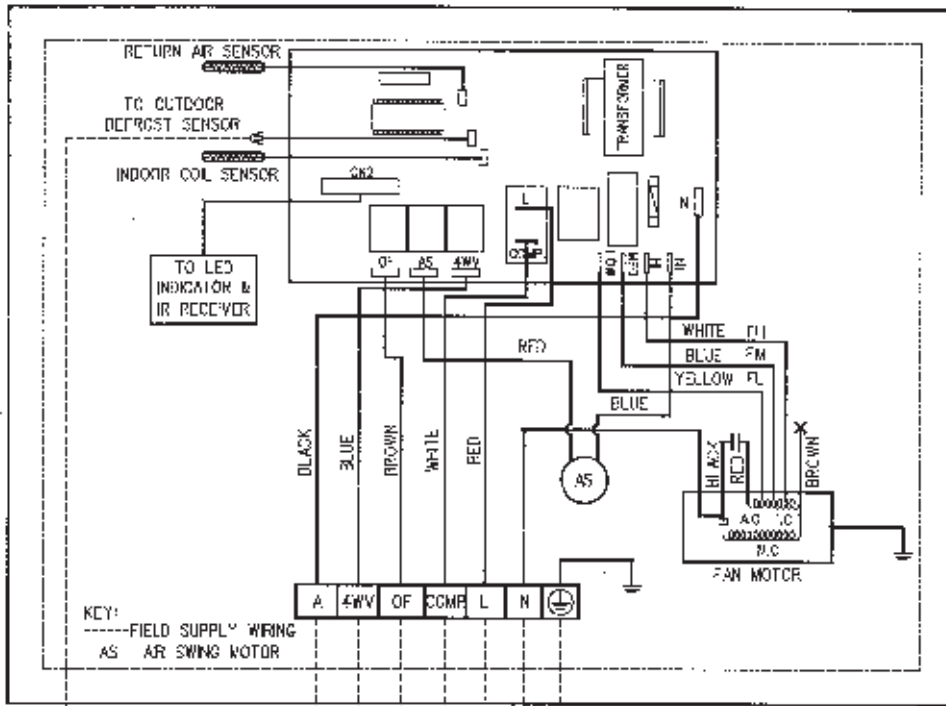


- E } 220 - 240V
- N } 1PH
- L } 50Hz
  
- R } 320 - 415V
- S } 3PH
- L } 50Hz



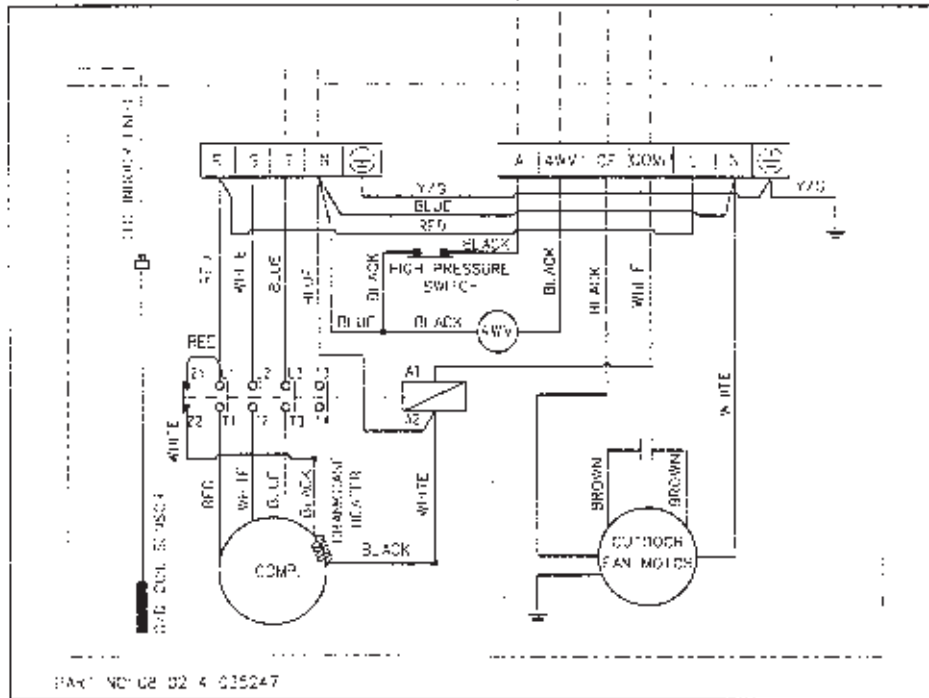
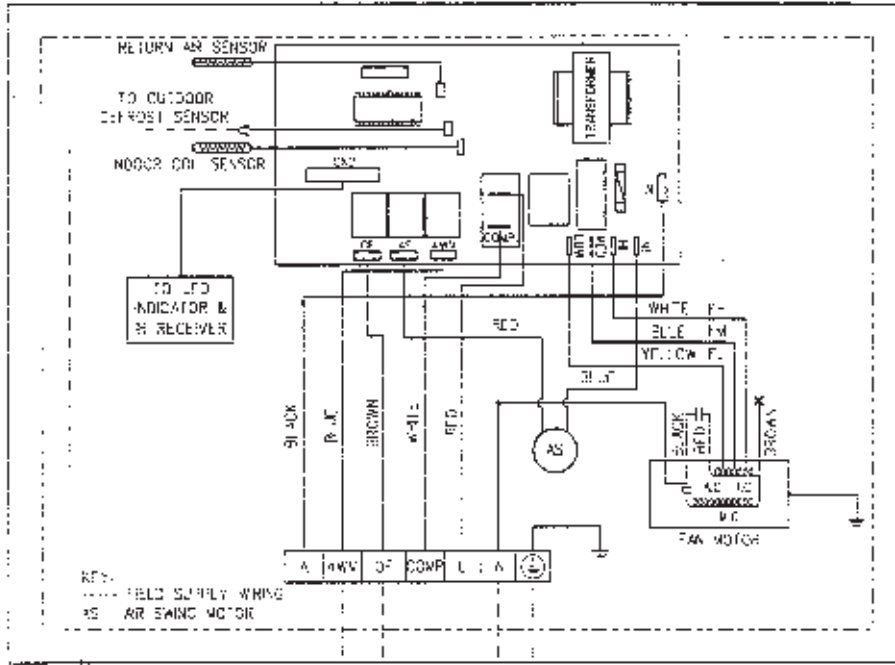
Model: MCM 020DR - MLC 020BR  
MCM 025DR - MLC 025BR







Model: MCM 040DR - MLC 040CR  
MCM 050DR - MLC 050CR



# Installation



**Caution**

Sharp edges and coil surface are potential injury hazard. Avoid from contact with them.

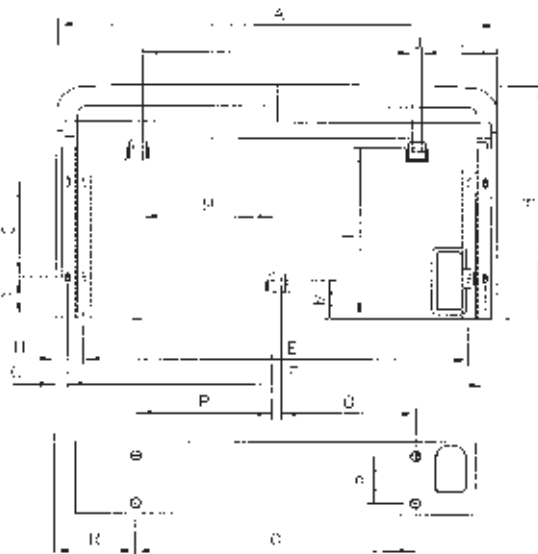
## (1) INSTALLATION OF INDOOR UNIT

### Preliminary Site Survey

- Electrical supply and installation shall conform to the local authority (eg. National Electrical Board).
- Voltage supply fluctuation must not exceed  $\pm 10\%$  of the rated voltage. Electricity supply lines must be independent of welding transformers which can cause high supply fluctuation.
- Ensure that the installation location is convenient for wiring and piping.

### Standard Mounting

Ensure that the overhead supports are strong enough to hold the weight of the unit. Position the hanger rods (wall mounting bracket for floor standing), and check for its alignment with the unit as shown in Figure A. Also, check that the hangers are secured and the base of the fan coil unit is leveled in both horizontal directions, taking into account the gradient for drainage flow as recommended in Figure B.



Model	MCM 020D/DR	MCM025D/DR	MCM030D/DR	MCM040D/DR	MCM050D/DR
A	1214	1214	1214	1714	1714
B	666	666	666	666	666
C	273	273	273	273	273
D	130	130	130	130	130
F	1160	1160	1560	1560	1560
G	27	27	27	27	27
H	77	77	77	77	77
I	745	745	745	1235	1235
J	25	25	25	25	25
K	209	209	209	331	331
L	486	486	486	486	486
M	108	108	108	108	108
N	360	360	360	600	600
O	770	770	770	1270	1270
P	136	136	136	136	136
Q	373	373	373	373	373
R	222	222	222	310	310

Note : Dimensions in mm

Figure A

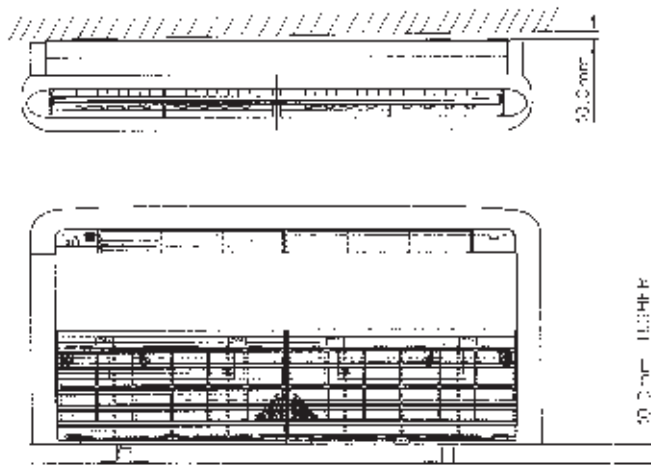


Figure B

Please ensure that the following steps are taken:

- Check the gradient for drainage flow as recommended in Figure B.
- Provide clearance for easy servicing and optimal air flow as shown in Figure B.
- The indoor unit must be installed such that there is no short circuit of the cool discharge air with the warm return air.
- Do not install the indoor unit where there is direct sunlight shining on the unit. The location should be suitable for piping and drainage installation. The unit must be a large distance away from the door.

### Semi-Enclose Mounting

- In case the units is to be half recessed into false ceiling, please check the unit is well align.

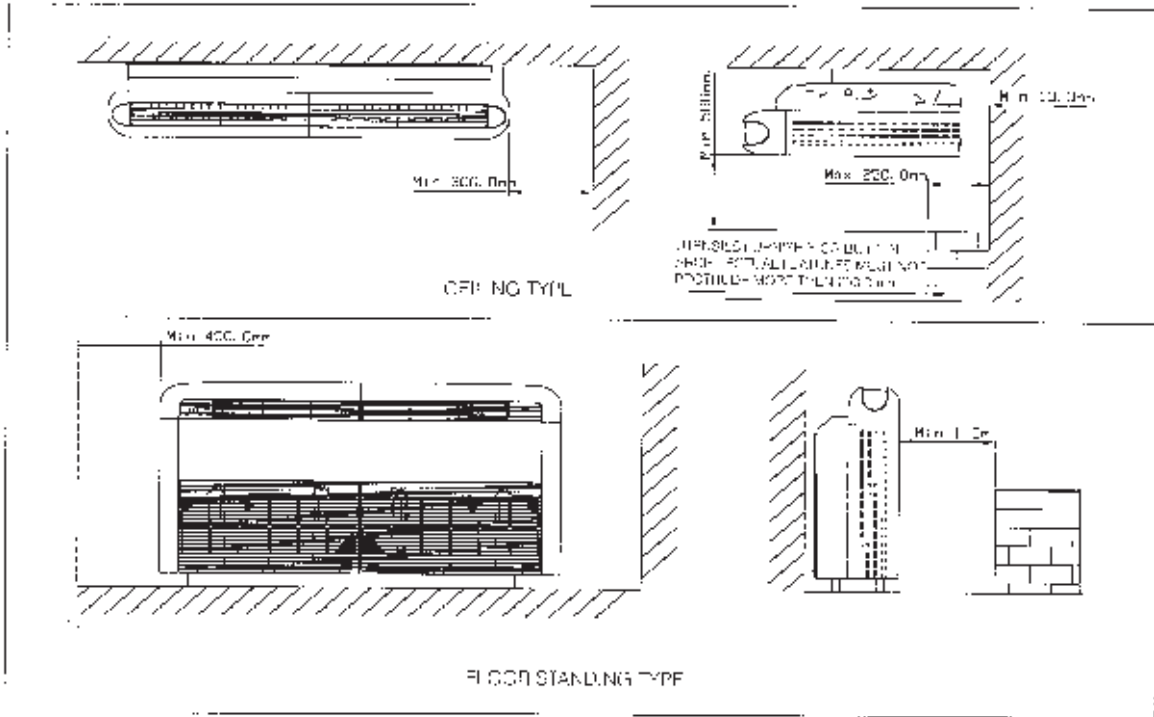


Figure C

- Provide the installation space as shown in Fig. D.

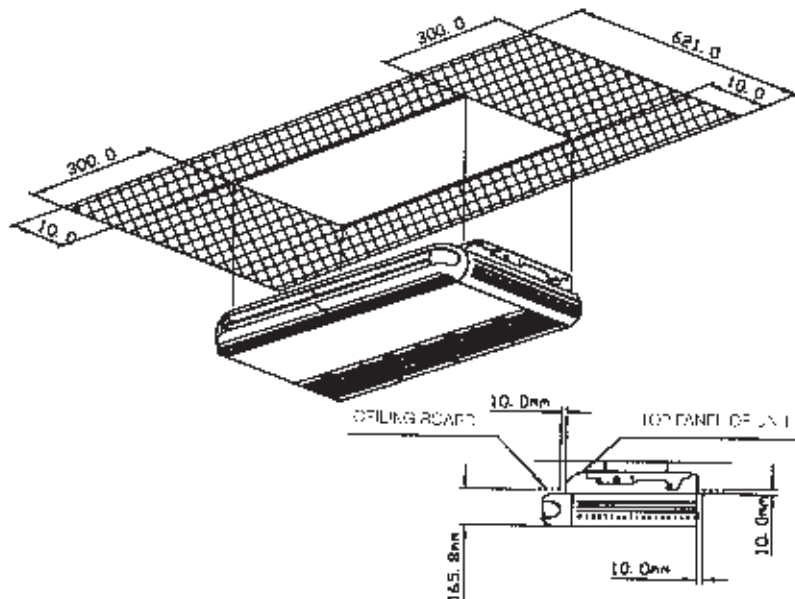


Figure D

## Installation - Ceiling Exposed Type

### STEP 1

Remove air intake grille, side panel, side close-up and hanger bracket from the unit; see Fig E.

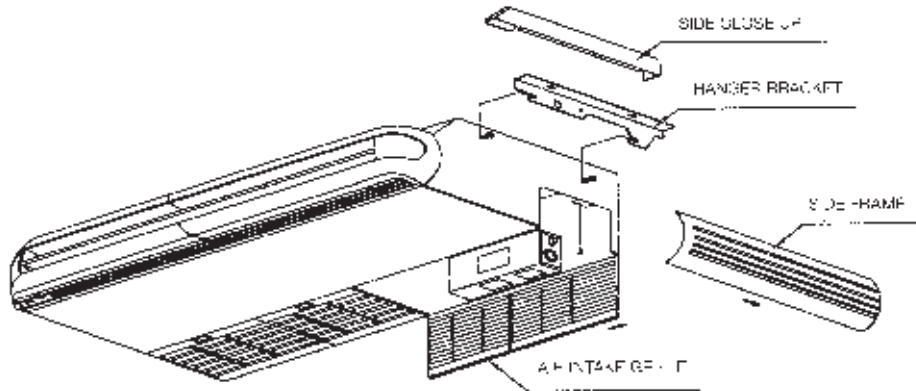


Figure E

### STEP 2

Position the hanger rods as per Fig B and install the hanger bracket; see Fig F.

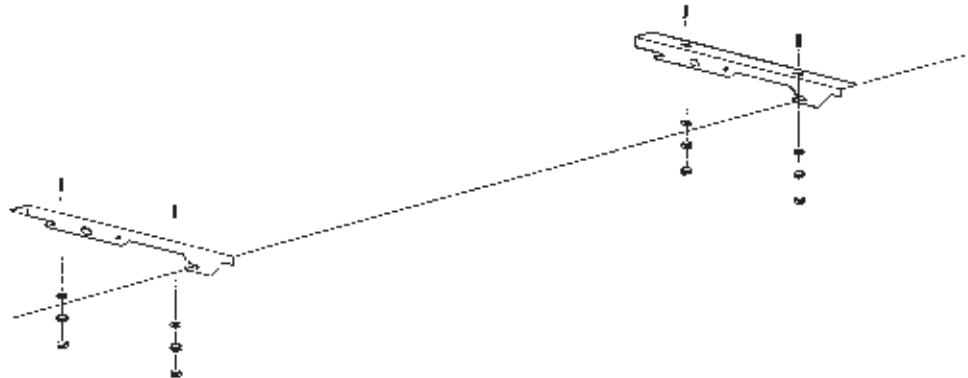


Figure F

### STEP 3

Hanger up the unit and tighten the bolt, after completed the piping and drain pipe; install back the grille and panel Fig. G.

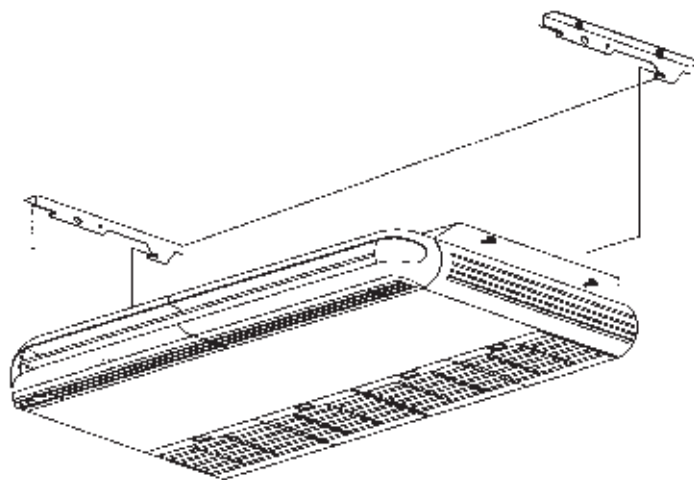


Figure G

## Installation - Floor Standing Type

### STEP 1

Remove air intake grille, side panel, side close-up and side panel from the unit; see Fig E.

### STEP 2

Position the floor support and wall mounting bracket as per Fig B. install the unit; see Fig 1.

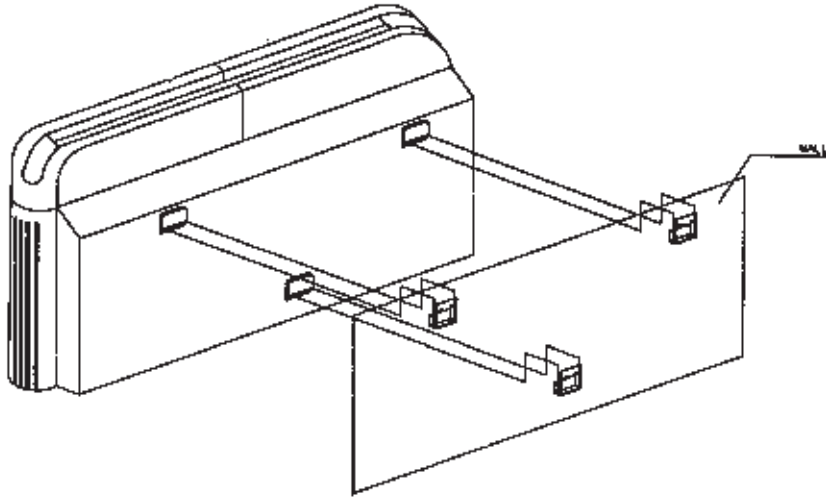


Fig I

\* Wall mounting bracket will be supplied upon request.

### STEP 3

Two type of piping and drain pipe connection as Fig J.

### Piping and drain pipe installation

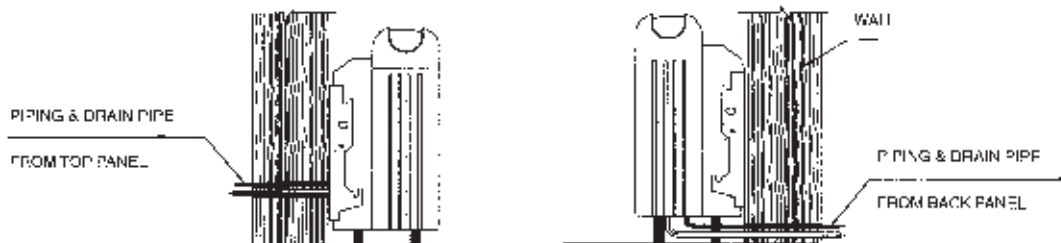
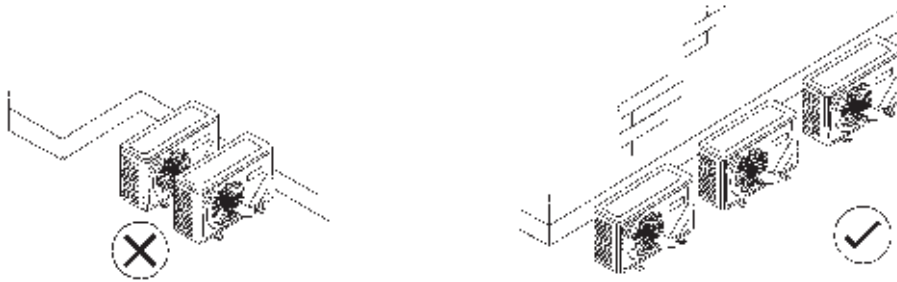


Fig J

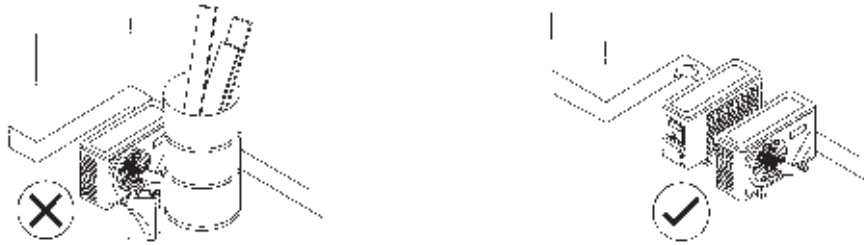
## (2) Installation Of Outdoor Unit

As condensing temperature rises, evaporating temperature rises and cooling capacity drops. In order to achieve maximum cooling capacity, the location selected for outdoor unit should fulfil the following requirements:-

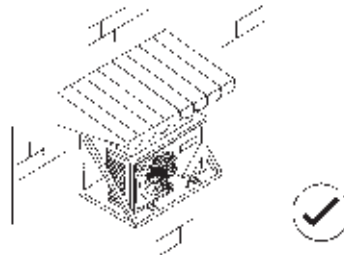
- Install the condensing (outdoor) unit in away such that hot air distributed by the outdoor condensing unit cannot be drawn in again (as in the case of short circuit of hot discharge air). Allow sufficient space for maintenance around the unit.



- Ensure that there are no obstruction of air flow into or out of the unit. Remove obstacles which block air intake or discharge.



- The location must be well ventilated, so that the unit can draw in and distribute plenty of air thus lowering the condensing temperature.
- A place capable of bearing the weight of the outdoor unit and isolating noise and vibration.
- A place protected from direct sunlight. Otherwise use an awning for protection, if necessary.

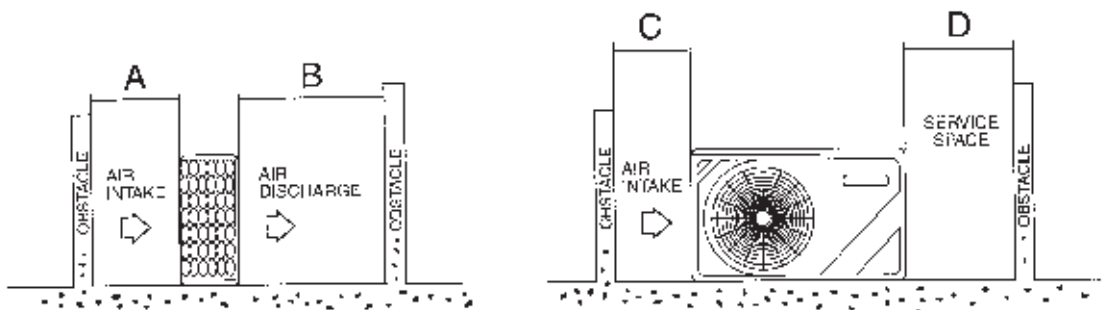


- The location must not be susceptible to dust or oil mist.

## Installation Clearance

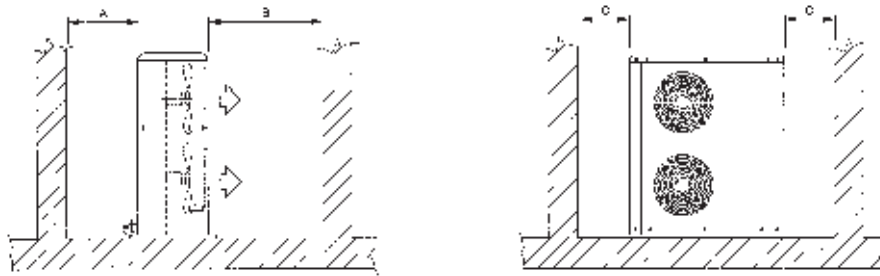
- Outdoor units must be installed such that there is no short circuit of the hot discharge air or obstruction to smooth air flow. Select the coolest possible place where intake air should not be hotter than the outside temperature (max. 45°C).

### MLC SERIES



Minimum Distance	A	B	C	D
Series I	150mm	1000mm	150mm	500mm
Series II	300mm	1000mm	300mm	500mm

## MMC SERIES



ALL MODELS	A	B	C
Minimum Distance	300mm	1000mm	300mm

### (3) Refrigerant Piping Maximum Pipe Length And Maximum Number Of Bends

- When the pipe length becomes too long, both the capacity and reliability drop. As the number of bends increases, system piping resistance to the refrigerant flow increases, thus lowering the cooling capacity, and as the result the

MODEL	020	025	030	040	050
Max. Length, L	15m	15m	20m	20m	20m
Max. Elevation, H	8m	8m	10m	10m	10m
Max. No. of bends	10	10	10	10	10

compressor may become defective. Always choose the shortest path and follow the recommendation as tabulated below:

MODEL	020	025	030	040	050
Liquid (mm/in)	6.35(1/4)	9.52(3/8)	9.52(3/8)	9.52(3/8)	9.52(3/8)
Suction (mm/in)	15.88(5/8)	15.88 (5/8)	15.88 (5/8)	19.05 (3/4)	19.05 (3/4)

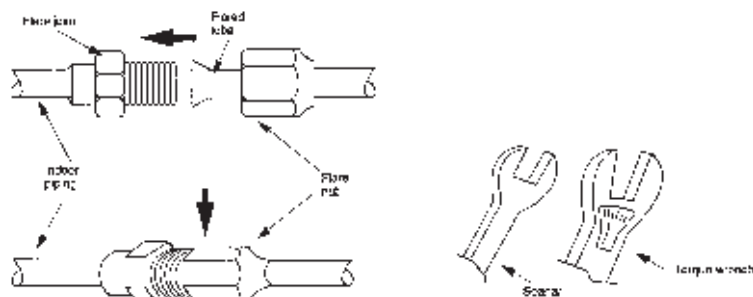
### Piping Sizes (Flare Connection Type)

- Piping sizes are as follows:

### Piping Connection To The Units

- Align the center of the piping and sufficiently tighten the flare nut with fingers.
- Finally, tighten the flare nut with torque wrench until the wrench clicks.
- When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

PIPE SIZE (mm/in)	TORQUE (Nm)
6.35(1/4)	18
9.53(3/8)	42
12.7(1/2)	55
15.88(5/8)	65
19.05(3/4)	78



## (4) Wiring Electrical Connections

- Wiring regulations on wire diameters differ from country to country. Please refer to your LOCAL ELECTRICAL CODES for field wiring rules. Be sure that installation comply with such rules and regulations.

## General Precautions

- Ensure that the rated voltage of the unit corresponds to the name plate before carrying out proper wiring according to the wiring diagram.
- Provide a power outlet to be used exclusively for each unit. A power supply disconnect and a circuit breaker for over-current protection should be provided in the exclusive line.
- The unit must be **GROUND**ED to prevent possible hazards due to insulation failures.
- All wiring must be firmly connected.
- All wiring must not touch the hot refrigerant piping, compressor or any moving parts of fan motors.

## (5) Vacuuming and Charging

- The precharged outdoor unit does not need any vacuuming or charging. However once it is connected, the connecting pipe line and the indoor need to be vacuumed before releasing the R22 from the outdoor unit.
  - Open the service port core cap.
  - Connect pressure gauge to the service port.
  - Connect the line to vacuum pump. Open the charging manifold valve and turn the pump on. (evacuation time varies by the capacity of the pump but averagely in 1 hour).

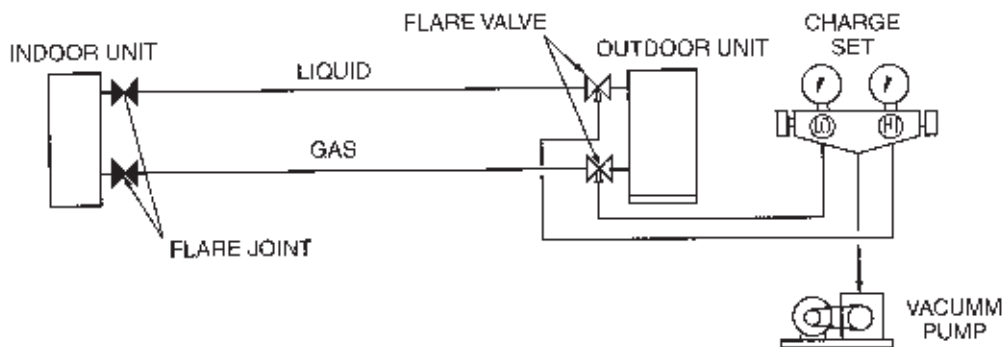


Diagram 1

- After evacuation, unscrew the spindle (diagram 2B) for the gas to run to indoor unit.

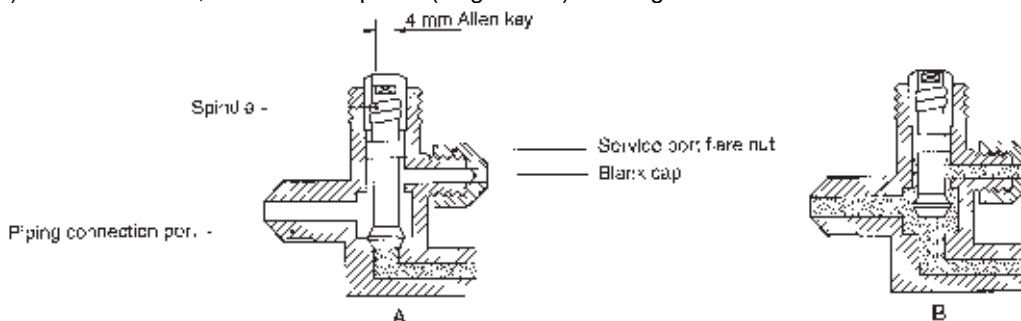


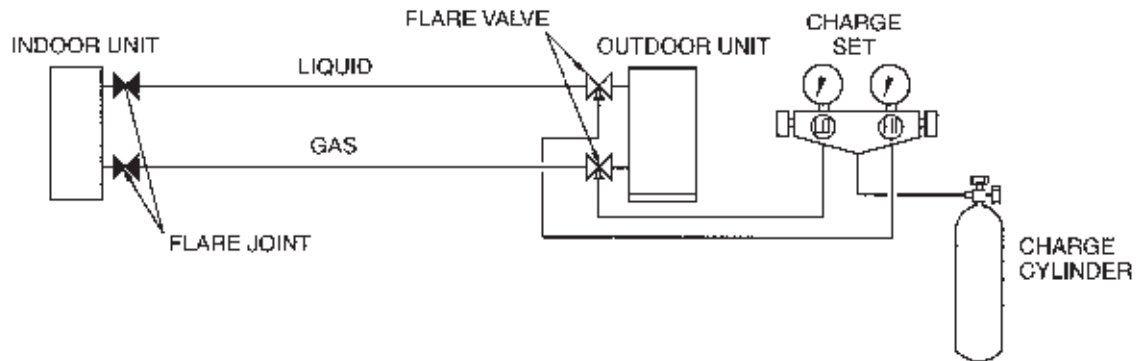
Diagram 2



## (6) Additional Charge

- The refrigerant gas has already charged into the outdoor unit. For the piping length of 5m. Additional refrigerant charge after vacuuming is not necessary.
- When the piping length is more than 5m, please use the table below (unit in gram).

MODEL	7m	10m	15m	20m
020	30	75	150	-
025	76	190	380	-
030	100	250	500	750
040	100	250	500	750
050	100	250	500	750



## (7) Overall Checking

- Ensure the following, in particular:
  - 1) The unit is mounted solidly and rigid in position.
  - 2) Piping and connections are leak proof after charging.
  - 3) Proper wiring has been done.
- Drainage check - pour some water into drain pan.
- Test run
  - 1) Conduct a test run after water drainage test and gas leakage test.
  - 2) Watch out for the following:
    - a) Is the electric plug firmly inserted into the socket?
    - b) Is there any abnormal sound from unit?
    - c) Is there any abnormal vibrations with regard to unit itself or piping?
    - d) Is there smooth drainage of water?
  - 3) Check that:
    - 1) Outdoor fan is running, with warm air blowing off the outdoor unit (cooling cycle).
    - 2) Indoor blower is running and discharge cool air (cooling cycle).
    - 3) Suction (low side) pressure as recommended is before this.
    - 4) The remote controller incorporate a 3 minute delay in there circuit. Thus, it requires about 3 minutes before the outdoor unit can start up.

## (8) Standard Operating Condition

### Cooling Only Unit

Temperature	Ts °C	Th °C
minimum indoor temperature	19.4	13.9
maximum indoor temperature	26.7	19.4
minimum outdoor temperature	19.4	13.9
maximum- outdoor temperature	46.0	24.0

### Heat Pump Unit

Temperature	Ts °C	Th °C
minimum indoor temperature	10.0	-
maximum indoor temperature	26.7	-
minimum outdoor temperature	-8.0	-9.0
maximum- outdoor temperature	24	18

Ts : Dry bulb temperature

Th : Wet bulb temperature

# Servicing and maintenance



**Disconnect from Main Supply before Servicing the air conditioner**

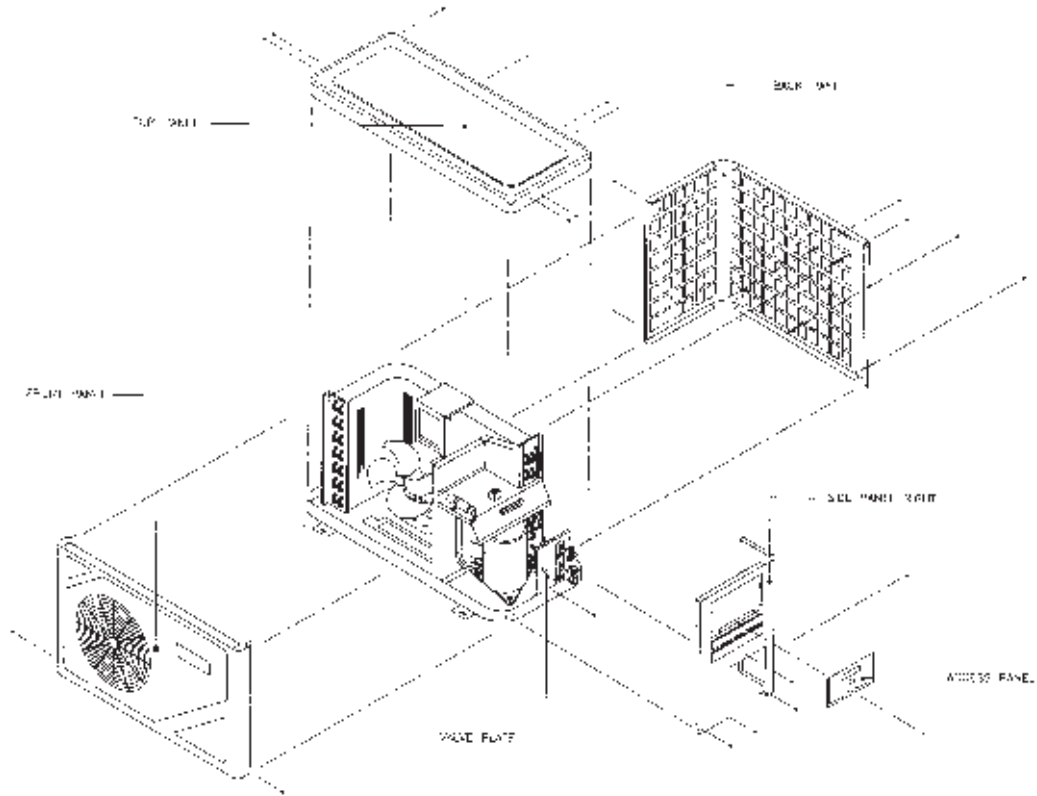
The unit is designed to give a long life operation with minimum maintenance required. However, it should be regularly checked and the following items should be given due attention.

Components	Maintenance Procedure	Recommended Schedule
Air Filters	<ol style="list-style-type: none"> <li>1. Clean with a vacuum cleaner, or by tapping lightly and then washing in lukewarm water (below 40°C) With neutral soap.</li> <li>2. Rinse well to dry before re-installing.</li> <li>3. Note Never use petrol, thinner, benzene or any other chemicals.</li> </ol>	Every 2 weeks. More frequently if required.
Indoor Unit	<ol style="list-style-type: none"> <li>1. Clean away dirt or dust on grille or panel by wiping with a soft cloth soaked in lukewarm (or cold) water or neutral detergent solution.</li> <li>2. Note: Never use petrol, thinner, benzene or any other volatile chemicals, which may cause plastic surface to deform.</li> </ol>	Every 2 weeks. More frequently if required.
Condensate Drain Pan & Pipe	<ol style="list-style-type: none"> <li>1. Check and clean.</li> </ol>	Every 3 months.
Indoor Fan	<ol style="list-style-type: none"> <li>1. Check for unusual noise.</li> </ol>	As necessary.
Indoor/Outdoor Coil	<ol style="list-style-type: none"> <li>1. Check and remove dirt which are clogged between fins.</li> <li>2. Check and remove obstacles which hinder air flow in and out of indoor/outdoor unit.</li> </ol>	Every month. Every month.
Electrical	<ol style="list-style-type: none"> <li>1. Check voltage, current and wiring.</li> <li>2. Check faulty contacts caused by loose connections, foreign matters, etc.</li> </ol>	Every 2 months. Every 2 months.
Compressor	<ol style="list-style-type: none"> <li>1. No maintenance needed if refrigerant circuit remains sealed. However, check for refrigerant leak at joints &amp; fittings.</li> </ol>	Every 6 months.
Compressor Lubrication	<ol style="list-style-type: none"> <li>1. Oil is factory charged. Not necessary to add oil if circuit remains sealed.</li> </ol>	No maintenance required.
Fan Motors Lubrication	<ol style="list-style-type: none"> <li>1. All motors pre-lubricated and sealed at factory.</li> </ol>	No maintenance required.

## PRE-START UP MAINTENANCE (AFTER EXTENDED SHUTDOWN)

- Inspect thoroughly and clean indoor and outdoor units.
- Clean or replace air filters.
- Clean condensate drain line.
- Clean clogged indoor and outdoor coils.
- Check fan imbalance before operation.
- Tighten all wiring connections and panels.
- Check for refrigerant leakage.

The design of the MLC outdoor series allows servicing to be carried out readily and easily. The removal of the top side, front and back panel make almost every part accessible.



Under normal circumstances, these outdoor units only require a check and cleaning of air intake coil surface once quarterly. However, if a unit is installed in areas subjected to much oil mist and dust, the coils must be regularly cleaned by qualified Air Conditioner Service Technicians to ensure sufficient heat exchange and proper operation. Otherwise, the systems life span may be shortened.

**CAUTION!**

Do not charge **OXYGEN, ACETYLENE OR OTHER FLAMMABLE** and poisonous gases into the unit when performing a leakage test or an air tight test. These gases could cause severe explosion and damage if expose the high temperature and pressure.  
It is recommended that only nitrogen or refrigerant be charged when performing the leakage or airtight test.

# Troubleshooting

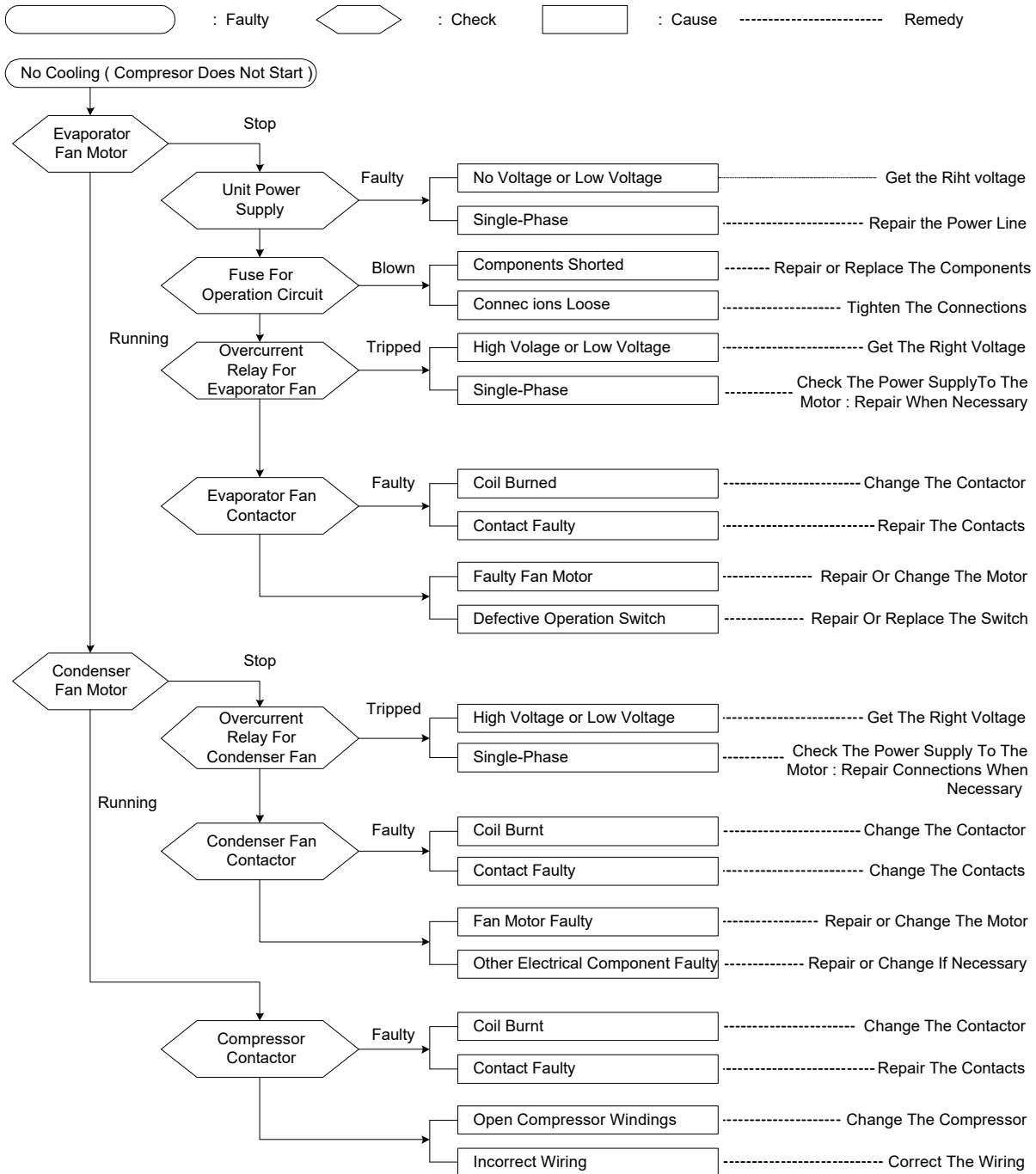
When any air-conditioner malfunction is noted, immediately switch off the power supply to the unit, and contact the local dealer, if necessary. Some simple troubleshooting tips are given below :

FAULT	CAUSE
1. Fan does not work 3 minutes after starting	<ul style="list-style-type: none"> <li>• Protection against the frequent starting. Wait 3 or 4 minutes.</li> </ul>
2. The air conditioning unit does not work	<ul style="list-style-type: none"> <li>• Power failure or you must be replaced the fuse.</li> <li>• The power plug is disconnected.</li> <li>• Possibility of making a programming error in the controller.</li> <li>• If the fault persist after these verifications, contact your installer.</li> </ul>
3. The air conditioning unit does not blow sufficiently	<ul style="list-style-type: none"> <li>• The air filter is dirty.</li> <li>• The doors or windows are open.</li> <li>• The air entrance and exit are clogged.</li> <li>• The regulate temperature is not high enough.</li> </ul>
4. The remote control light is deficient	<ul style="list-style-type: none"> <li>• The batteries are discharge.</li> <li>• The batteries are not correctly inserted.</li> <li>• The assembly is not good.</li> </ul>
5. Air discharge flow has a bad odor	<ul style="list-style-type: none"> <li>• This odor can be caused by cigarette smoke particles, perfume, sweat, which stick to the coil.</li> <li>• Check if there is any moisture on the walls, garment, other.</li> <li>• Check the drain pan.</li> </ul>
6. Condensation on the air grille of indoor unit	<ul style="list-style-type: none"> <li>• This is due to air humidity after a long time of operation.</li> <li>• The unit has a lower temperature point, increase the point and operate at high speed.</li> </ul>
7. The water flow of air conditioning unit	<ul style="list-style-type: none"> <li>• Check the condensate evacuation.</li> </ul>
8. The air conditioning unit are noisy	<ul style="list-style-type: none"> <li>• "Air flow noise" : refrigerant fluid admission in evaporator.</li> </ul>

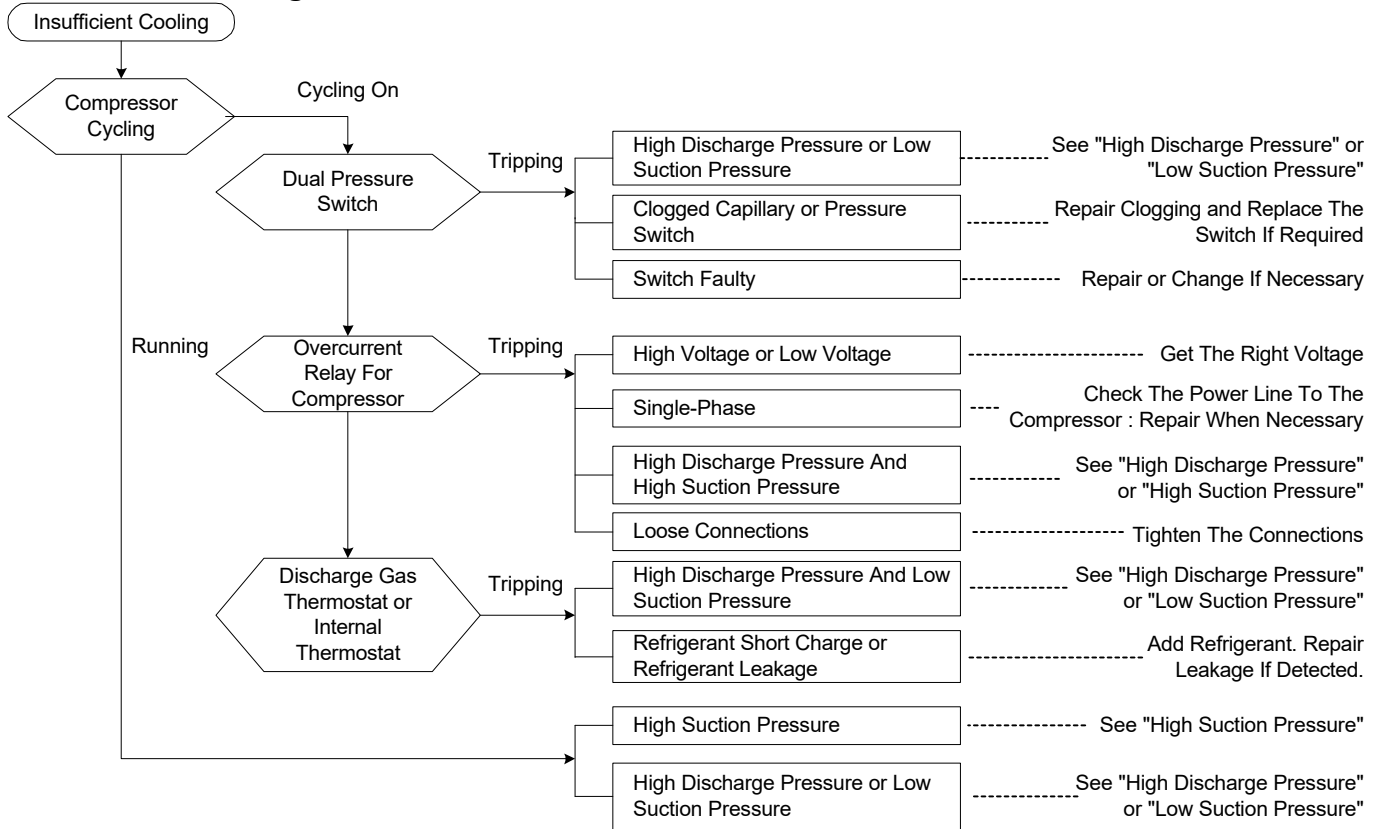
# Diagnosis By Flow Chart (Cooling Only)

The following chart are efficient checking procedures for troubleshooting when these fan-coil units, are coupled with the condensing units using standard wiring. For dual circuited models, perform the procedures for each circuit.

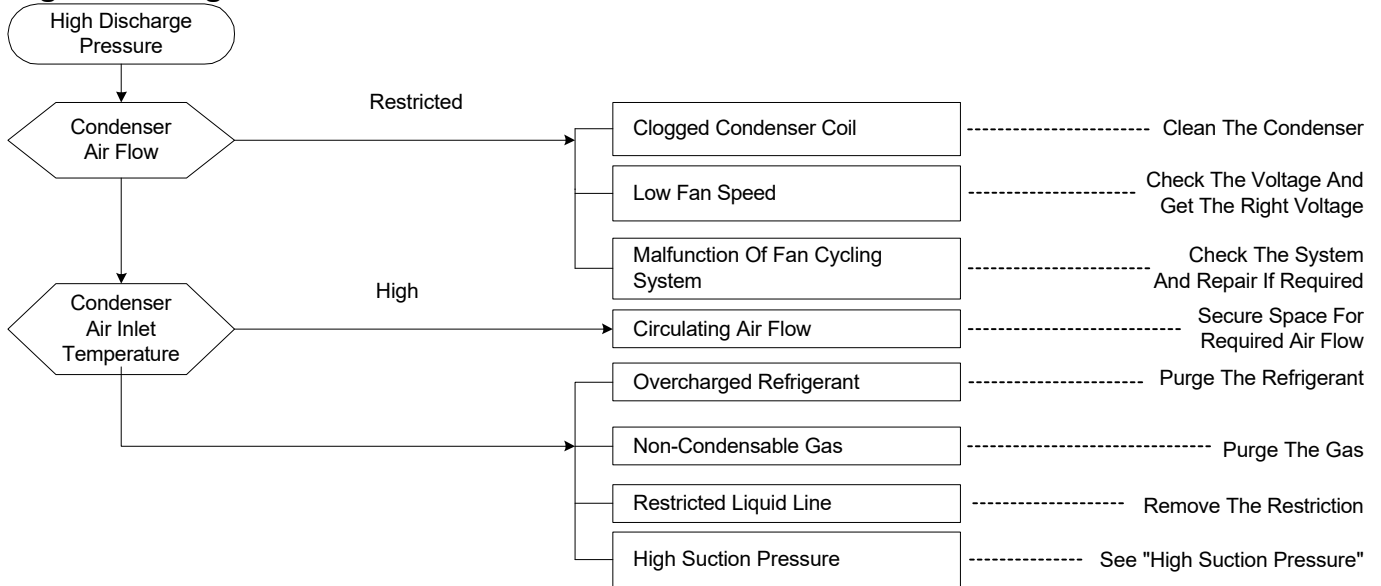
## No Cooling



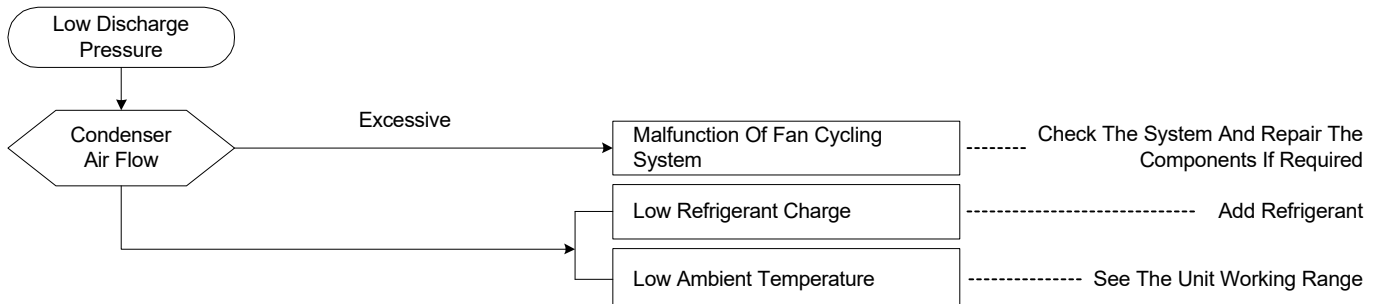
## Insufficient Cooling



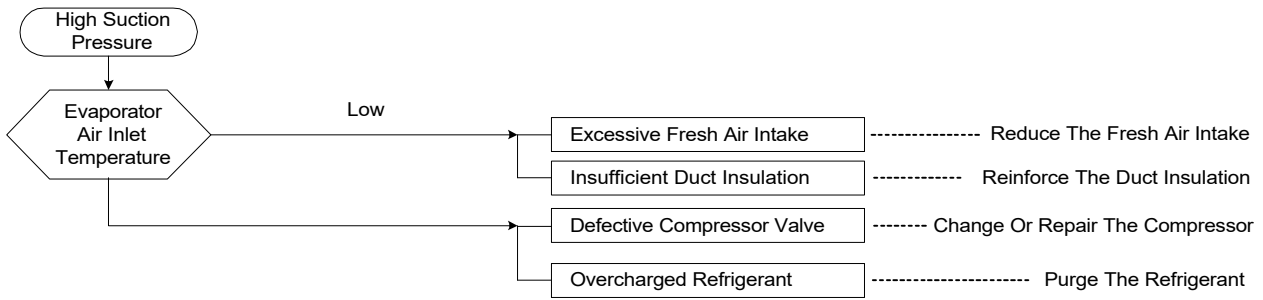
## High Discharge Pressure



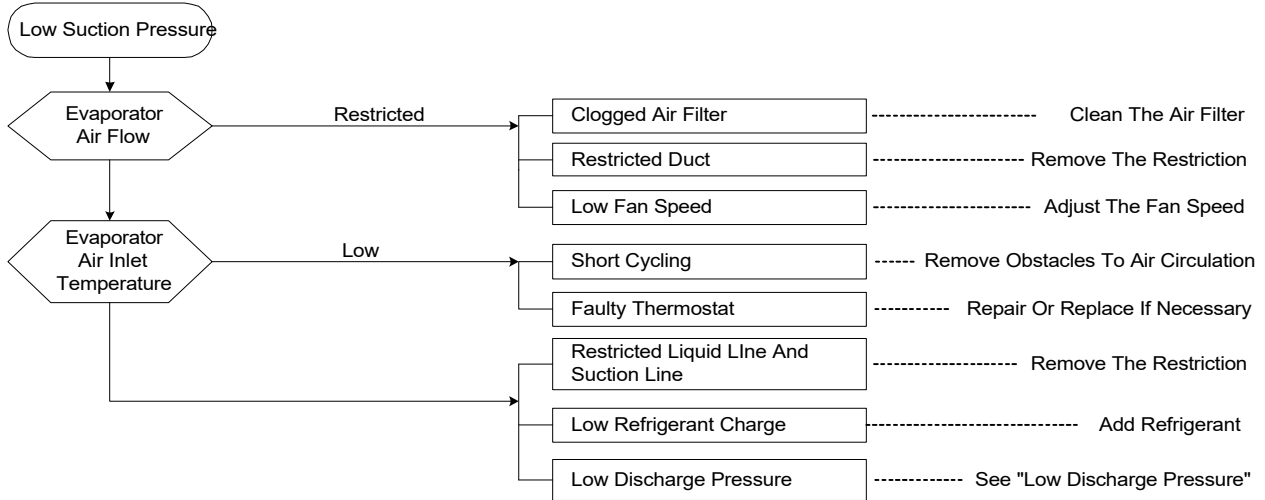
## Low Discharge Pressure



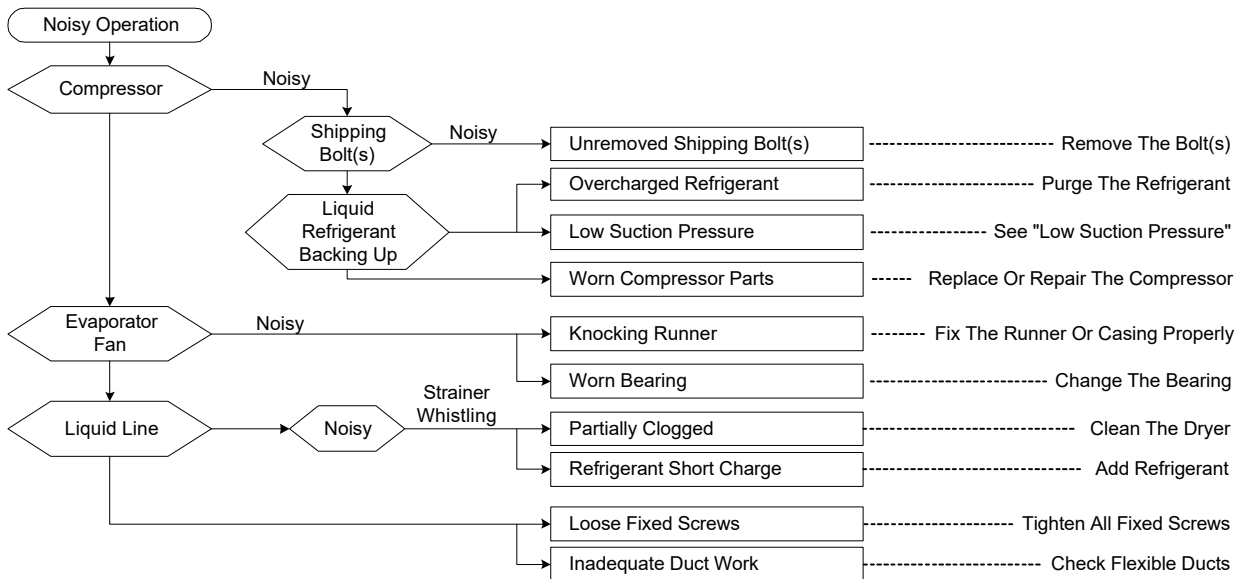
## High Suction Pressure



## Low Suction Pressure



## Noisy Operation





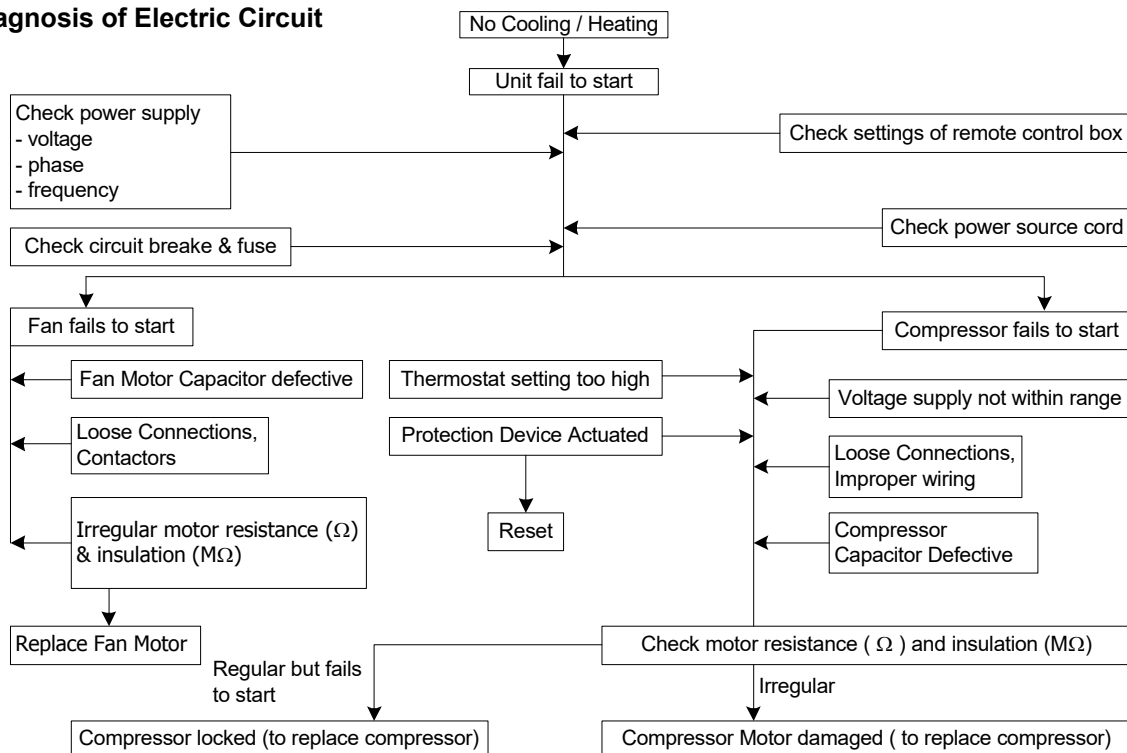
**For Heat Pump Models**  
**By means of pressure readings :**

PRESSURE						PROBABLE CAUSE
Data Circuit	Too Low	A Little Low	Normal	A Little High	Too High	
High Side Low Side					● ●	1. Overcharged with refrigerant. 2. Non-condensable gases in refrigerant circuit (e.g. oil). 3. Obstructed air-intake/discharge. 4. Short circuiting of hot air outdoor unit.
High Side Low Side	●				●	1. Poor compression/no compression (compressor defective.) 2. Check valve stick in open position. 3. Reversing valve leaking.
High Side Low Side	●	●				1. Undercharged with refrigerant. 2. Refrigerant leakage. 3. Air filter clogged/dirty (indoor unit). 4. Indoor fan locked. 5. Defective defrost control, outdoor coil freeze up (heating). 6. Outdoor fan locked (heating).
High Side Low Side				●	●	1. Outdoor fan blocked (cooling). 2. Outdoor coil dirty (cooling). 3. Indoor fan locked (heating). 4. Indoor filter clogged/dirty (heating). 5. Non-condensable gases in refrigerant circuit (e.g. air)
High Side Low Side				●	●	1. Air intake temperature of indoor unit too high.

**By Means Of Diagnosis Flow Chart**

Generally, there are two kind of problems, i.e. starting failure and insufficient cooling/heating. "Starting Failure" is caused by electrical defect while "Insufficient Cooling/Heating" is caused by improper application or defects in refrigerant circuit.

**i) Diagnosis of Electric Circuit**

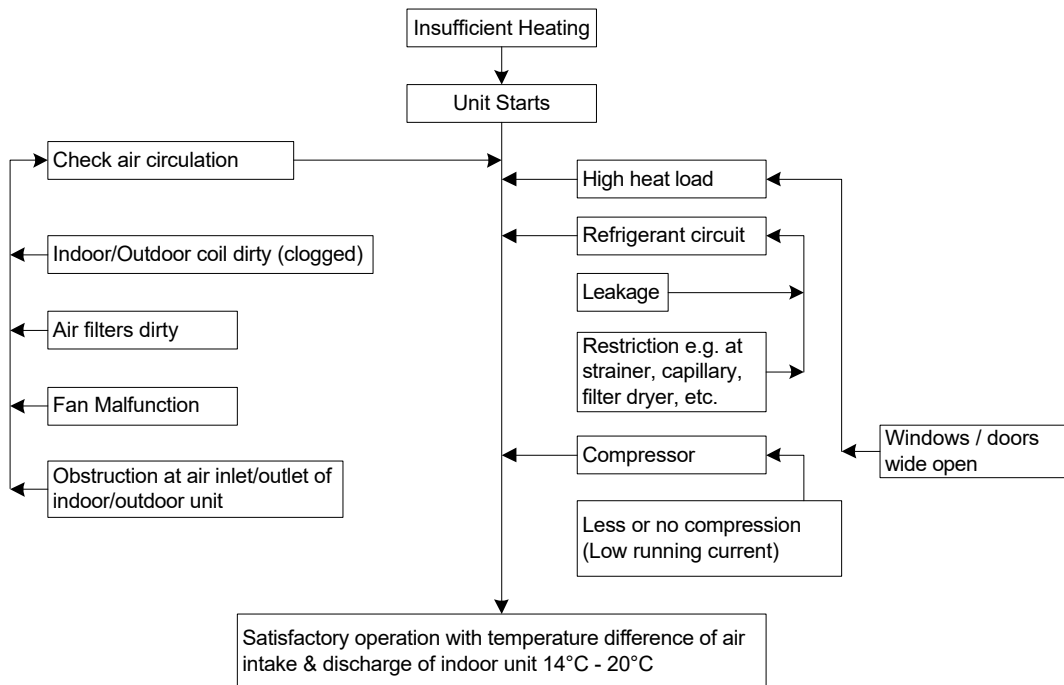
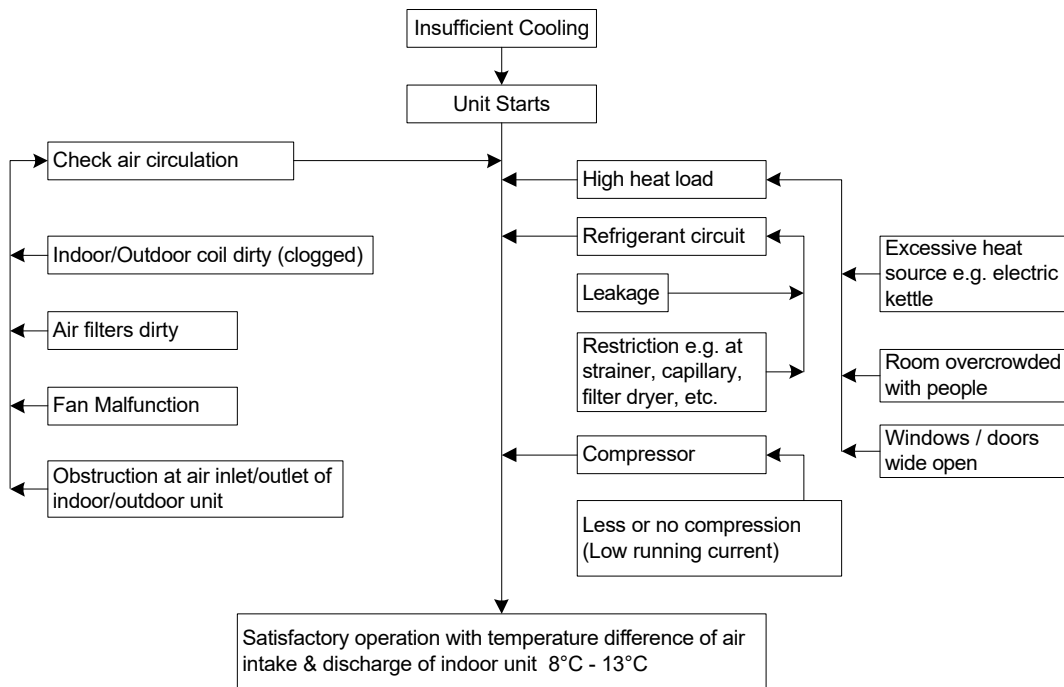


The most common causes of air conditioner failure to “start” are:

- a) Voltage not within  $\pm 10\%$  of rated voltage.
- b) Power supply interrupted.
- c) Control settings improper.
- d) Air conditioner is disconnected from main power source.
- e) Fuse blown or circuit breaker off.

## ii) Diagnosis Of Refrigerant Circuit / Application

There might be some cases where the unit starts running but does not perform satisfactory, i.e. insufficient cooling. Judgement could be made by measuring temperature difference of indoor unit's intake and discharge air as well as running current.





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