INSTALLATION INSTRUCTIONS AND HOMEOWNER'S MANUAL

MODELS

COND-09-01

COND-12-01

COND-18-01

COND-24-01

INSTALLER / SERVICE TECHNICIAN:

Use the information in this manual for the installation / servicing and keep the document near the furnace for future reference.

Communication wire connected between the indoor and outdoor units must be rated for at least 120VAC, they are protected by the outdoor unit breaker and must be sized appropriatly.

Do not install any metering device on the indoor coil. The expension valve is located in the outdoor unit. If a metering device is already installed in the indoor coil, it must be removed.

Both refrigerant lines must be separately insulated in order to avoid condensation and to ensure proper efficiency.

	COND-09-01	COND-12-01	COND-18-01	COND-24-01
Liquid line dia (In)	1/4	1/4	1/4	1/4
Gas line dia (In)	1/2	1/2	5/8	5/8

HOMEOWNER:

Please keep this manual near the furnace for future reference.

CAUTION

DO NOT TAMPER WITH THE UNIT OR ITS CONTROLS. CALL A QUALIFIED SERVICE TECHNICIAN.
THE WELDS MUST BE DONE BY USING NITROGEN PROTECTIVE GAS. NON-COMPLIANCE WILL MEAN THE IMMEDIATE CANCELLATION OF THE WARRANTY.

Manufactured by :
Dettson Industries Inc.
3400, Industrial Boulevard
Sherbrooke (Quebec) Canada J1L 1V8
www.dettson.ca/

QUICK SETUP

Simple start-up using communicating thermostat with modulating furnace

1. Turn off the breaker of the outdoor unit and the furnace
2. Connect COND1 and COND2 on the interface card to N(1) and 2 at the outdoor unit (See Figure 13 to Figure 15)
3. Connect the RJ-11 wire between the interface and the furnace control board (See Figure 13 to Figure 15)
4. Position the temperature sensor (included) on the crossover of the indoor coil and connect it to the terminal T1 and Tc of the interface (See section 6.8.1-)
5. Turn the outdoor unit “ON”
6. Turn the furnace “ON”

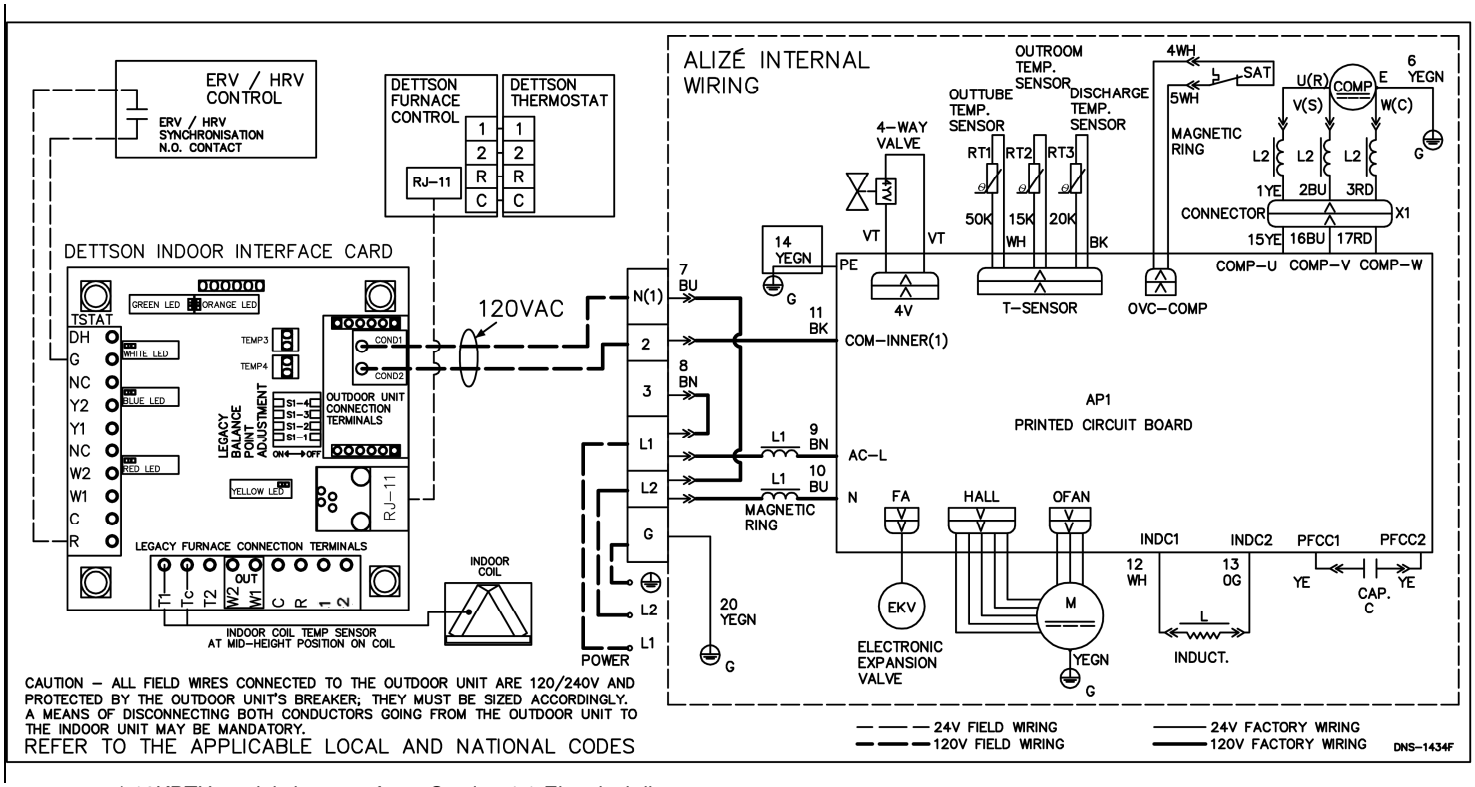
Make sure the unit is working properly

1. The Green LED on the interface card should be blinking once every two seconds
2. The Orange LED on the interface card should be blinking once every two seconds
3. The communicating thermostat will display “Heat Pump Found”
4. Set the thermostat to “COOL” mode and adjust the set point to a lower value than the actual room temperature
5. The furnace and the outdoor unit should start within 5 minutes

In this configuration, the interface card will gather information from both the outdoor unit and the furnace in order to adjust the fan speed to the capacity of the outdoor unit

Legacy connection

1. Connect all the thermostat control wires to the interface card and the air handler control board (See Figure 28)
2. Make sure to connect the heat output W1 out and W2 out of the thermostat to the W1 and W2 inputs of the furnace – OR – W on W2 on a single stage thermostat
3. Connect COND1 on the interface card to N(1) at the outdoor unit (See Figure 28) and connect COND2 on the interface card to N(2) at the outdoor unit
4. Set the dipswitches to the desired balance point (See Table 2)



* 18KBTU model shown, refer to Section 4.1-Electrical diagrams.

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1- SAFETY PRECAUTIONS

Installing, starting up, and servicing air conditioner can be hazardous due to system pressure, electrical components, and equipment location, etc.

Only trained, qualified installers and service personnel are allowed to install, start-up, and service this equipment.

When handling the equipment, observe precautions in the manual and on tags, stickers on the equipment. Follow all safety codes. Wear safety glasses and work with gloves. Keep quenching cloth and fire extinguisher nearby when brazing.

Read the instructions thoroughly and follow all warnings or cautions in literature and attached to the unit. Always follow building codes and current edition of national as well as local electrical codes.

Recognize the following safety information:

Warning: Incorrect handling could result in personal injury or death

Caution: Incorrect handling may result in minor injury, or damage to product or property

 **WARNING**

1.1- WARNING

All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual

- ⇒ Before installing, modifying, or servicing the system, the main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switches with a suitable warning label;
- ⇒ Never supply power to the unit unless all wiring and tubing are completed, connected and checked;
- ⇒ This system contains dangerous electrical voltage. Incorrect connection or inadequate grounding can cause personal injury or death. Stick to the wiring diagram and all the instructions when wiring;
- ⇒ Have the unit adequately grounded in accordance with the local electric codes;
- ⇒ Have all wiring connected tightly. Loose connections may lead to overheating and a possible fire hazard.

All installation or repair work shall be performed by your dealer or a specialized subcontractor as there is the risk of fire, electric shock, explosion or injury.

- ⇒ Make sure the outdoor unit is installed on a stable, level surface with no accumulation of snow, leaves, or trash beside;
- ⇒ Avoid contact between refrigerant and fire as it generates poisonous gas;
- ⇒ Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant lines as it may lead to rupture and other hazards;
- ⇒ Make sure no refrigerant gas is leaking out when installation is completed;
- ⇒ Should there be refrigerant leakage, the density of refrigerant in the air shall in no way exceed its limited value, or it may lead to explosion;
- ⇒ Keep your fingers and clothing away from any moving parts;
- ⇒ Clear the site after installation. Make sure no foreign objects are left in the unit;
- ⇒ Always ensure effective grounding of the unit.

 **CAUTION**

1.2- CAUTION

- ⇒ Never install the unit in a place where a combustible gas might leak, it may lead to fire or explosion;
- ⇒ Provide a ground fault interrupter (GFI) when it is installed in a wet environment;
- ⇒ Never wash the unit with water
- ⇒ Handle unit transportation with care. The unit should not be carried by only one person if it is more than 20 kg;
- ⇒ Never touch the heat exchanger fins with bare hands;
- ⇒ Never touch the compressor or refrigerant piping without wearing gloves;
- ⇒ Make sure that the air handler filter is clean;
- ⇒ Should any emergency occur, stop the unit and disconnect the power immediately;
- ⇒ Properly insulate **ALL** refrigerant tubing from outdoor units to the interior cooling coil to prevent condensation.

1.3- SPECIFICATIONS TABLE

Table 1: Outdoor unit specifications

Model			COND-09-01	COND-12-01	COND-18-01	COND-24-01
Power supply	Rated voltage	V~	208/230			
	Rated frequency	Hz	60			
	Phase		1			
Cooling capacity (min~max)		Btu/h	9000(3500~9600)	12000(3100~13000)	18000(4600~20000)	24000(6800~26000)
Heating capacity (min~max)		Btu/h	9800(2200~11000)	13000(2400~14000)	19000(3400~20000)	25000(7500~26000)
Cooling power input (min~max)		W	600(330~1200)	882(380~1300)	1500(180~2450)	2000(450~3050)
Heating power input (min~max)		W	650(100~1250)	960(100~1350)	1580(232~2500)	2090(450~3300)
Cooling current input		A	5.7	6	7.36/6.65	9.1
Heating current input		A	7	7.5	7.75/7.01	11.36
Rated input		W	1300	1400	2500	3200
Rated current		A	9	9	11.1	16
EER *		(Btu/h)/W	14.5	12.8	12	13
COP *			3.8	3.5	3.5	3.3
SEER *			27	25	21	21
HSPF *			9	9	9.8	10
Compressor type			Rotary			
Compressor LRA		A	13.8	13.8	27	40
Compressor RLA		A	3.2	3.2	8.4	12
Compressor power input		W	860	860	1245	2450
Throttling method			Electronic expansion valve			
Set temperature range		° F (°C)	60.8~86 (16-30)			
Cooling operation ambient temperature		° F (°C)	40~109.4 (14~43)			
Heating operation ambient temperature		° F (°C)	5~75.2 (-15~24)			
Condenser form			Aluminum fins-copper tube			
Condenser pipe diameter		inch(cm)	ϕ0.31(0.79)	ϕ0.3(0.76)	ϕ0.38(0.97)	ϕ0.31(0.79)
Condenser rows-fin gap		inch	2.5-0.06	2.5-0.06	2-0.06	3-0.06
		cm	6.35-0.15	6.35-0.15	5.08-0.15	7.62-0.15
Condenser coil dimensions (LxDxW)		inch	30x2.2x21.7	30x2.2x21.7	32x1.7x26.0	37.5x2.25x30
		cm	76.2x5.59x55.12	76.2x5.59x55.12	81.28x4.32x66.04	95.25x5.16x76.2
Fan motor speed		rpm	600/750/850	600/750/850	700	780/390
Fan motor power output		W	40	40	60	90
Fan motor RLA		A	0.18	0.18	0.28	n/a
Air flow volume		CFM	1177	1177	1883.2	2354
Fan type			Axial-flow			
Fan diameter		inch(cm)	ϕ17.5(44.45)	ϕ17.5(44.45)	ϕ20.5(52.07)	ϕ21.7(55.12)
Defrosting method			Automatic defrosting			
Climate type			T1			
Isolation			I			
Moisture protection			IP24			
Permissible excessive operating		MPa	4.3	4.3	4.3	3.8
Permissible excessive operating		MPa	2.5	2.5	2.5	1.2
Sound pressure level		dB (A)	49	49	56	56
Sound power level		dB (A)	59	59	66	66
Dimensions (WxHxD)		inch	35.4x23.5x14.9	35.4x23.5x14.9	37.6x27.6x15.6	38.6x31.1x16.8
		cm	89.92x59.69x37.85	89.92x59.69x37.85	95.50x70.10x39.62	98.04x79x42.68
Dimensions of carton box(WxHxD)		inch	37.2x24.8x16.4	37.2x24.8x16.4	40.4x28.9x17.9	42.7x33.1x19.1
		cm	94.49x62.99x41.66	94.49x62.99x41.66	102.62x73.41x45.47	108.46x84.07x48.51
Dimensions of package(WxHxD)		inch	37.3x25.4x16.5	37.3x25.4x16.5	40.5x29.5x18.0	42.8x33.7x19.2
		cm	94.74x64.52x41.91	94.74x64.52x41.91	102.87x74.93x45.72	108.71x85.60x48.77
Net weight		lb	86	87.1	110.3	154.3
Gross weight		lb	90.4	91.5	116.9	165.3
Refrigerant			R410A			
Refrigerant charge		oz	45.9	45.9	56.5	91,7
Connection pipe length		ft (m)	24.6 (7.5)			
Connection pipe gas additional charge		oz/ft.	0.2		0.5	
Liquid pipe outer diameter		inch	ϕ 1/4			
Gas pipe outer diameter		inch	ϕ 1/2		ϕ 5/8	
Max distance height		ft (m)	32.8 (10)			
Max distance length		ft (m)	49.2 (15)	65.6 (20)	82 (25)	82 (25)

1.4- OPERATION CHARACTERISTICS CURVES

Figure 1: 9K Operation characteristic curves

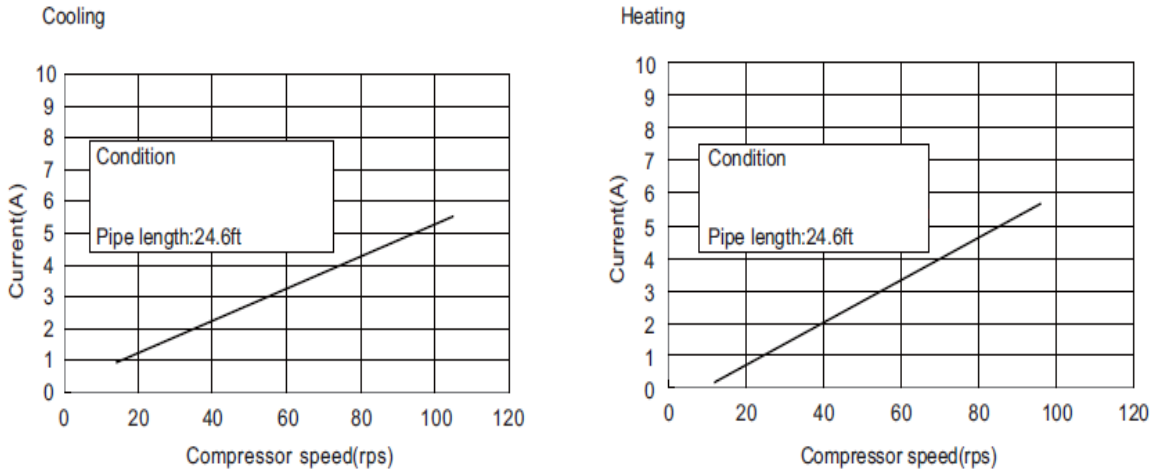


Figure 2: 12K Operation characteristics curves

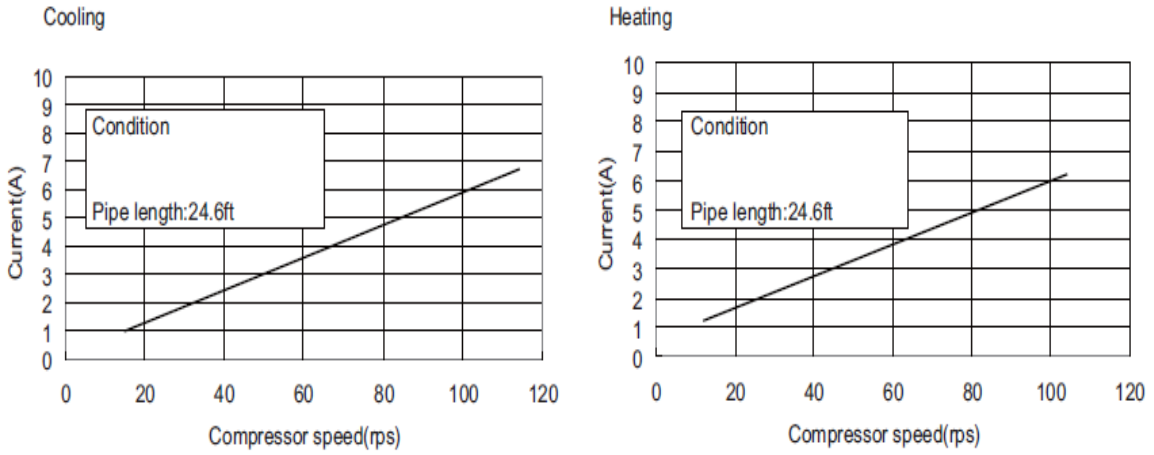
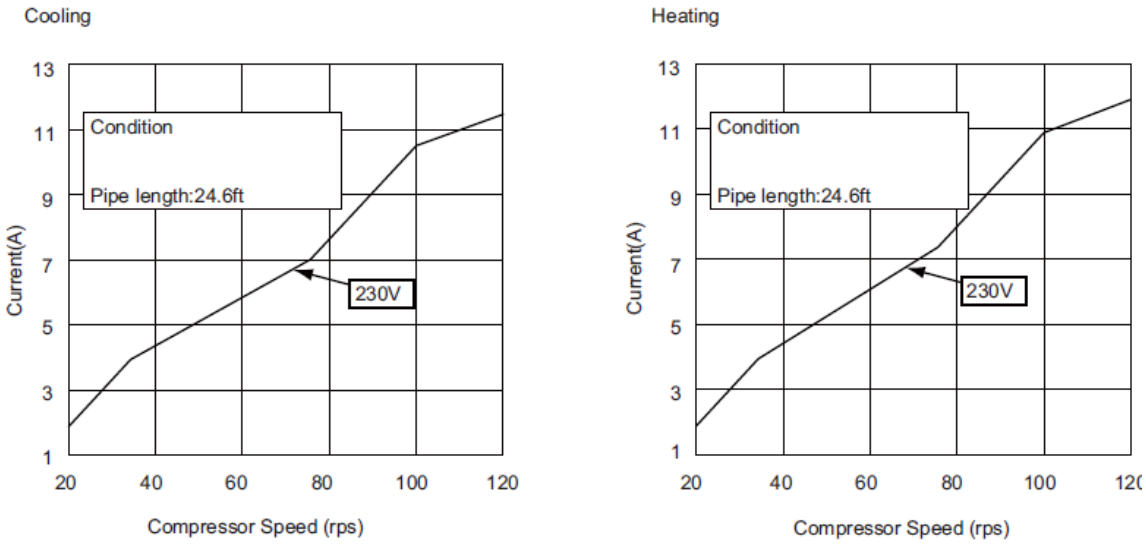


Figure 3: 18/24K Operation characteristics curves



1.5- CAPACITY VARIATION RATIO ACCORDING TO TEMPERATURE

Figure 4: 9/12K Capacity ratio vs outdoor temperature

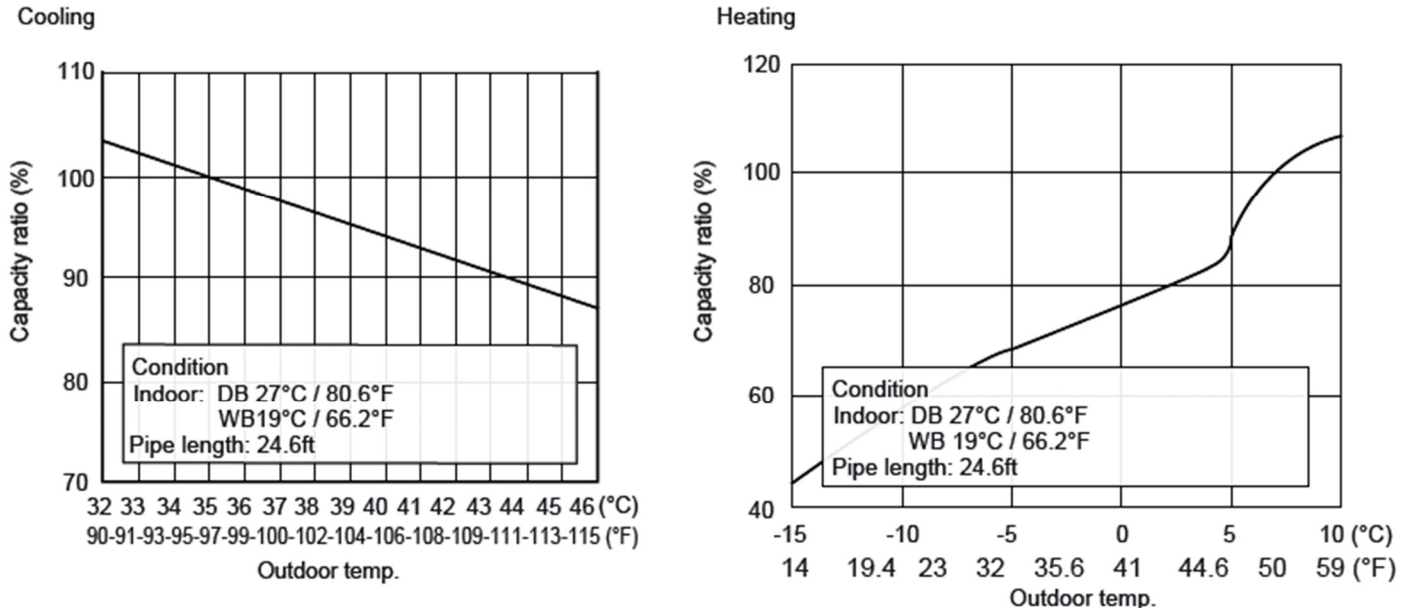
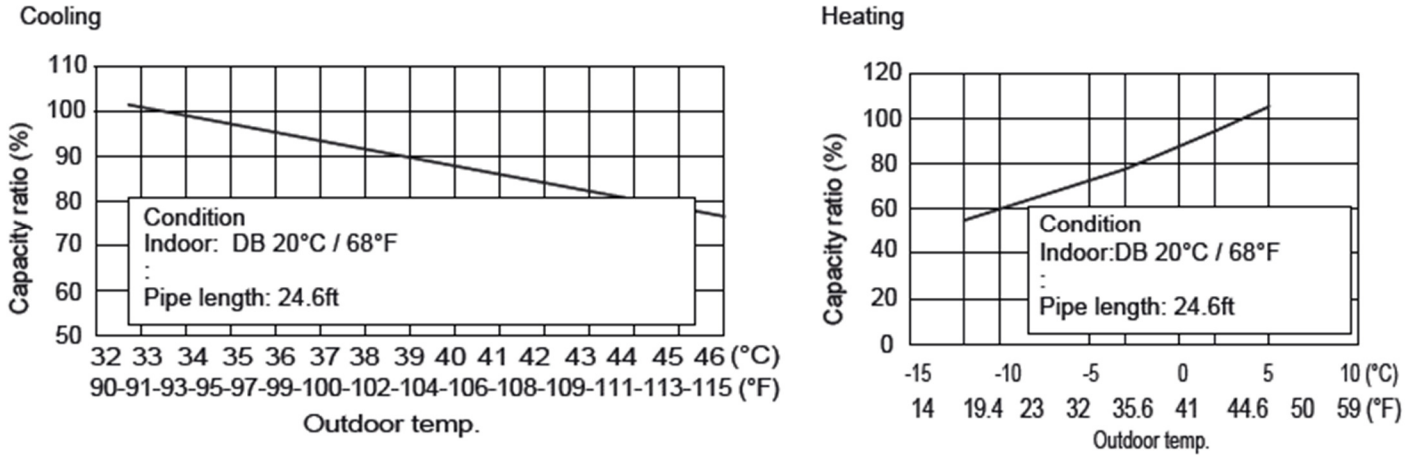


Figure 5: 18/24K Capacity ratio vs outdoor temperature



1.6- NOISE CRITERIA CURVE TABLES

Figure 6: 9K Noise curves

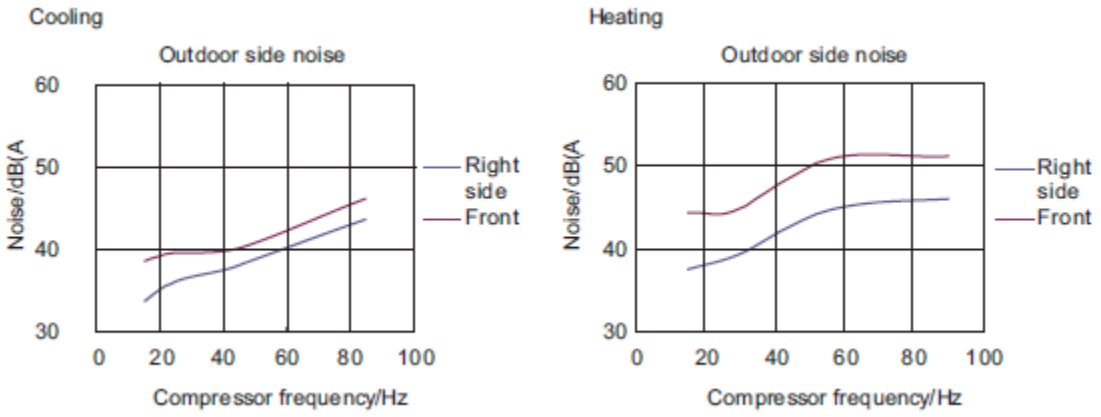


Figure 7: 12K Noise curves

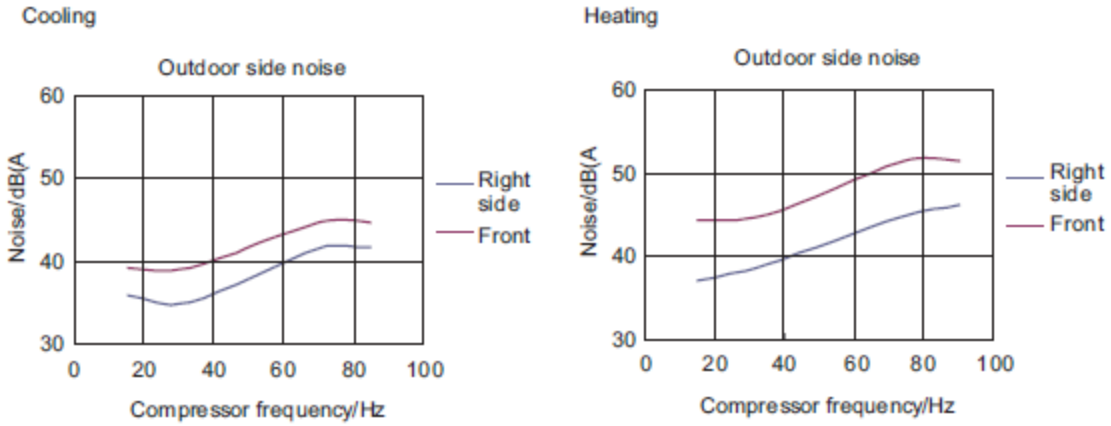
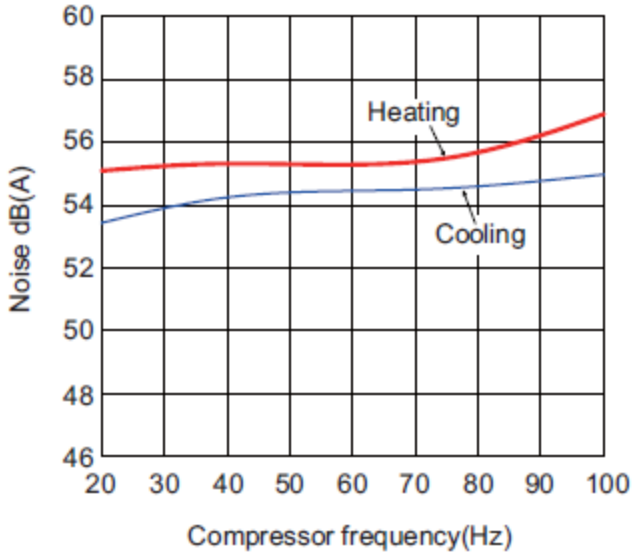


Figure 8: 18/24K Noise curve



2- CONSTRUCTION VIEWS

Figure 9: 9/12K dimensions

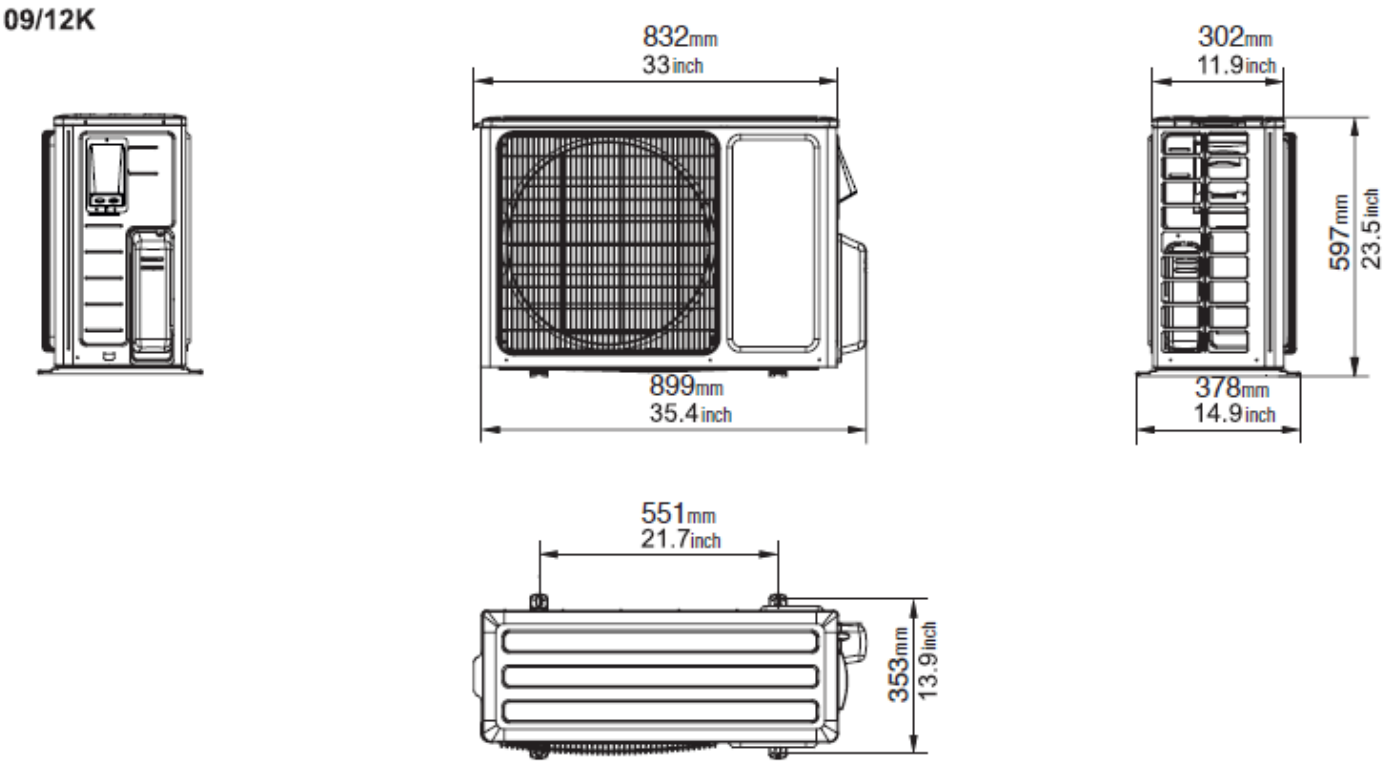


Figure 10: 18K dimensions

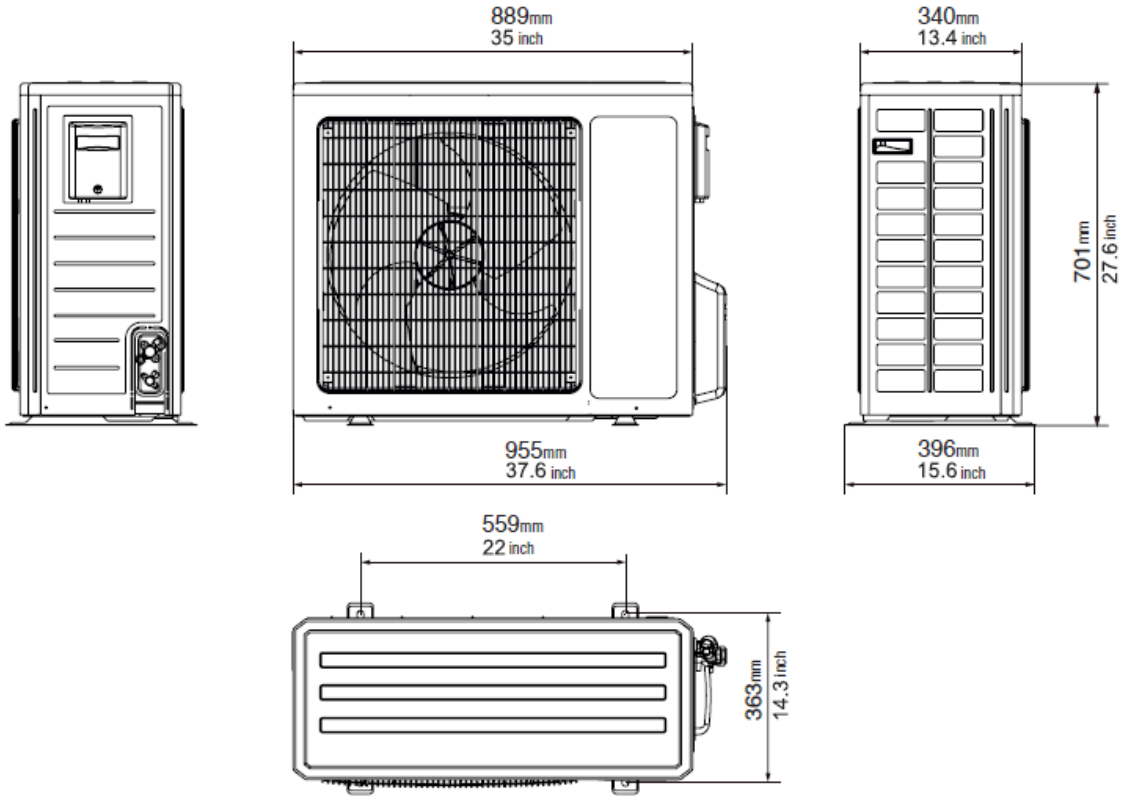
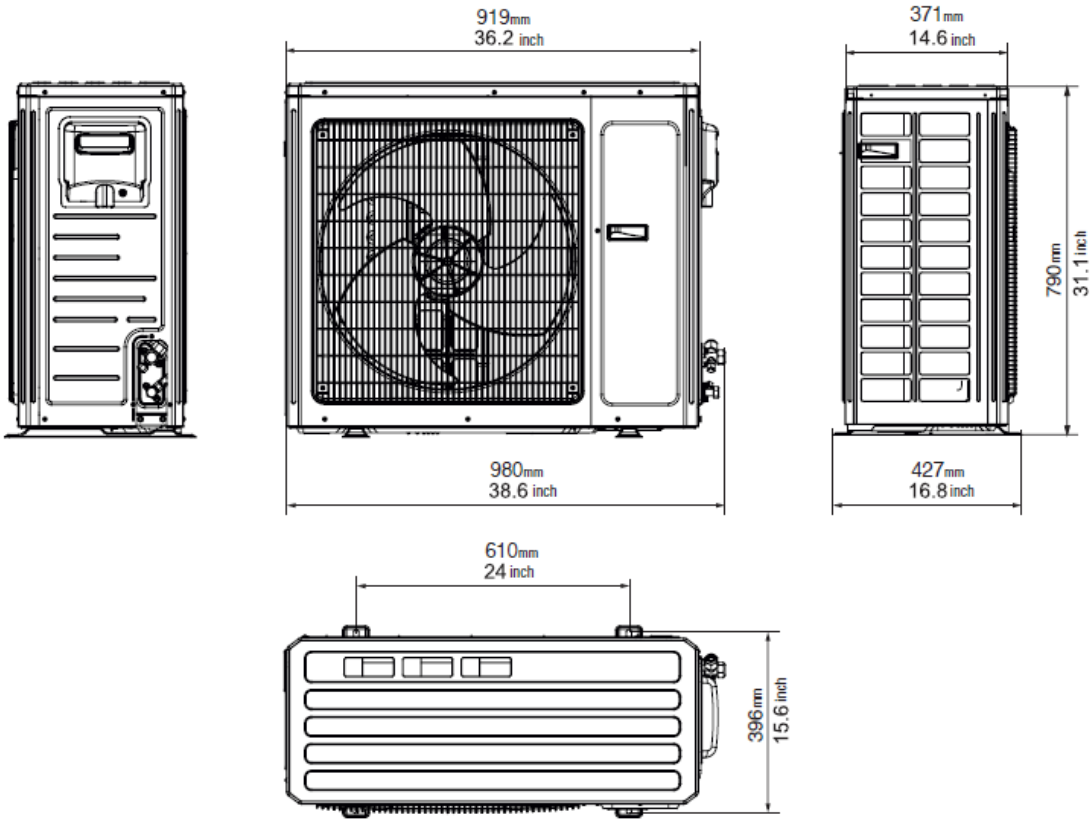
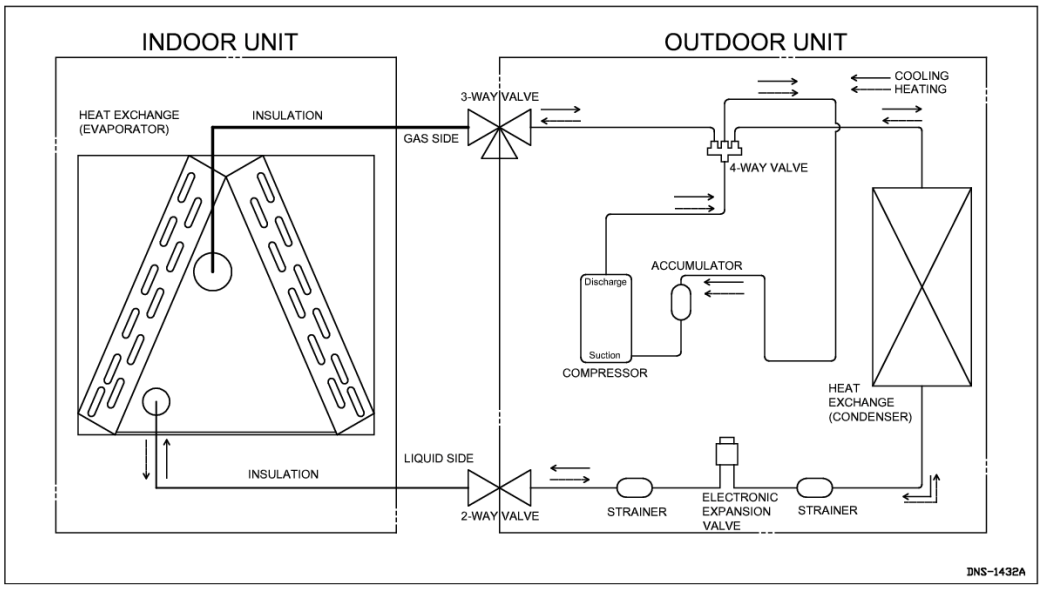


Figure 11: 24K dimensions



3- REGRIGERANT SYSTEM DIAGRAM

Figure 12: refrigerant system diagram



* Properly insulate **ALL** refrigerant tubing from outdoor units to the interior cooling coil to prevent water dripping.

4- SCHEMATIC DIAGRAMS

Symbol	Part name	Symbol	Color symbol	Symbol	Color symbol
C1	CBB61	BN	BROWN	WH	WHITE
C2	CBB65	BU	BLUE	YE	YELLOW
SAT	OVERLOAD	BK	BLACK	RD	RED
COMP	COMPRESSOR	OG	ORANGE	YEGN	YELLOW GREEN
⏚	PROTECTIVE EARTH	WH	WHITE	/	/

4.1- ELECTRICAL DIAGRAMS

Figure 13: 9/12K Electrical diagram

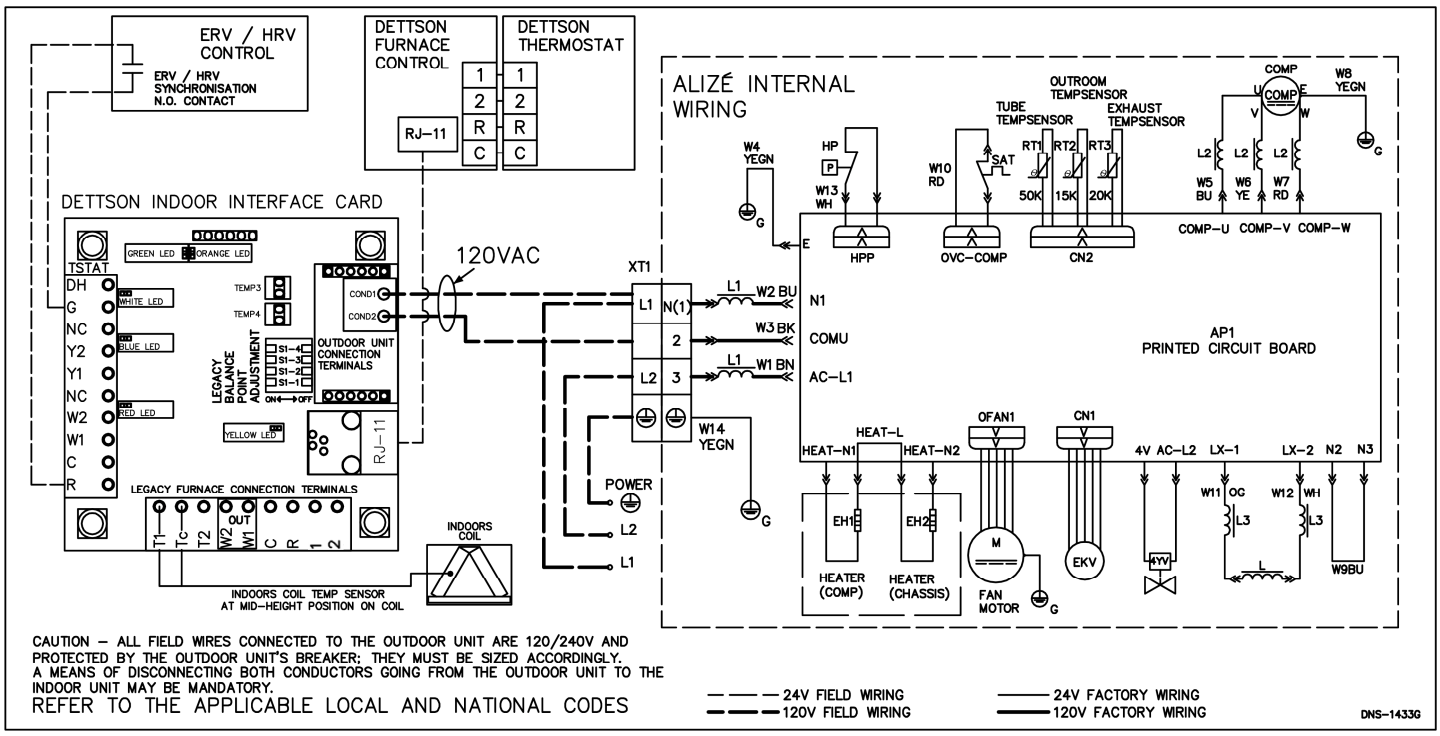


Figure 14: 18K Electrical diagram

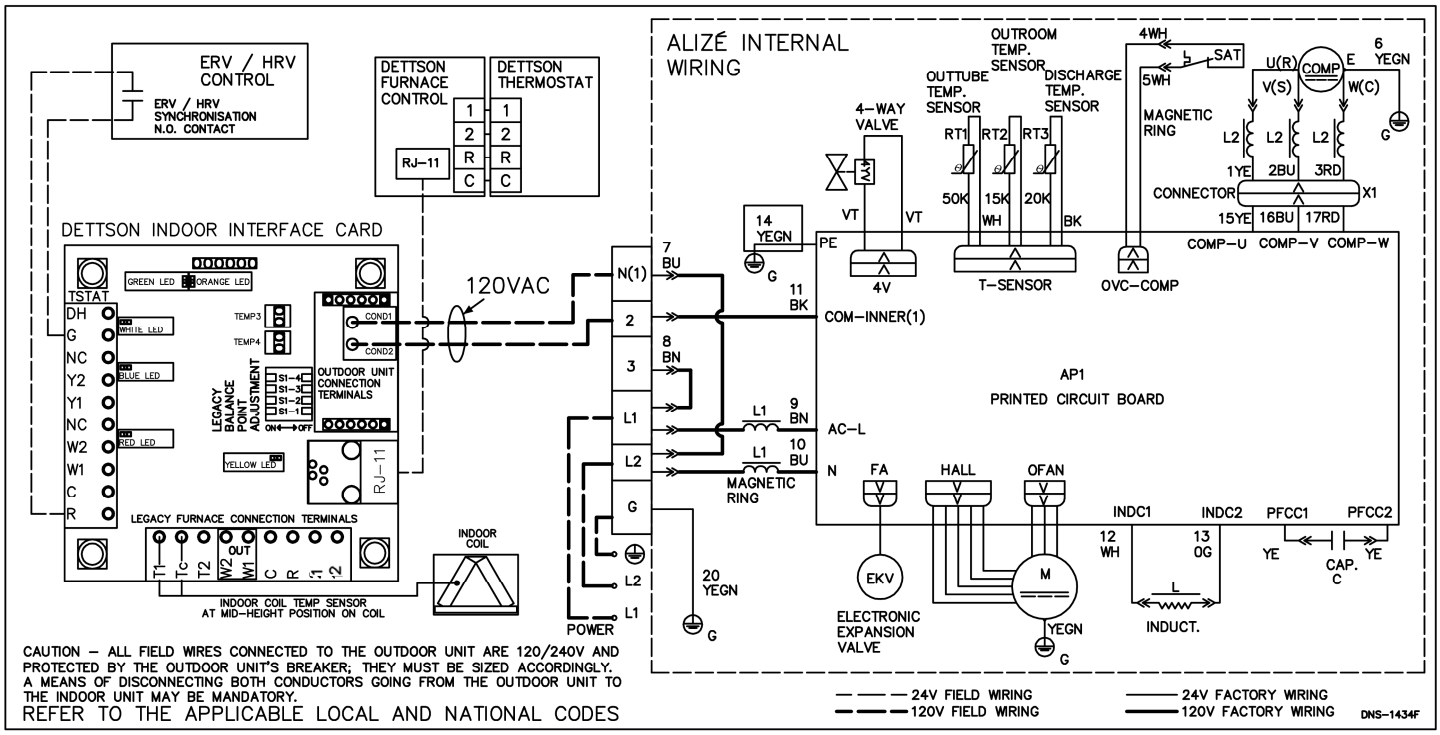
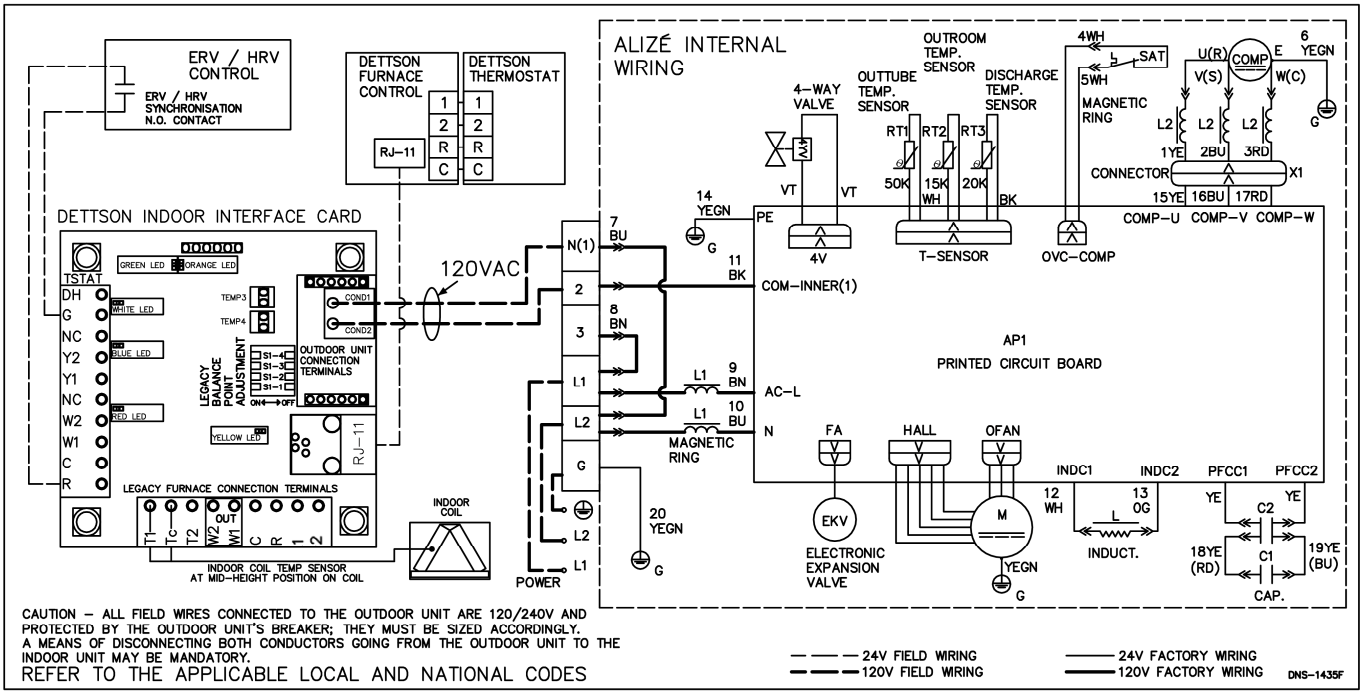
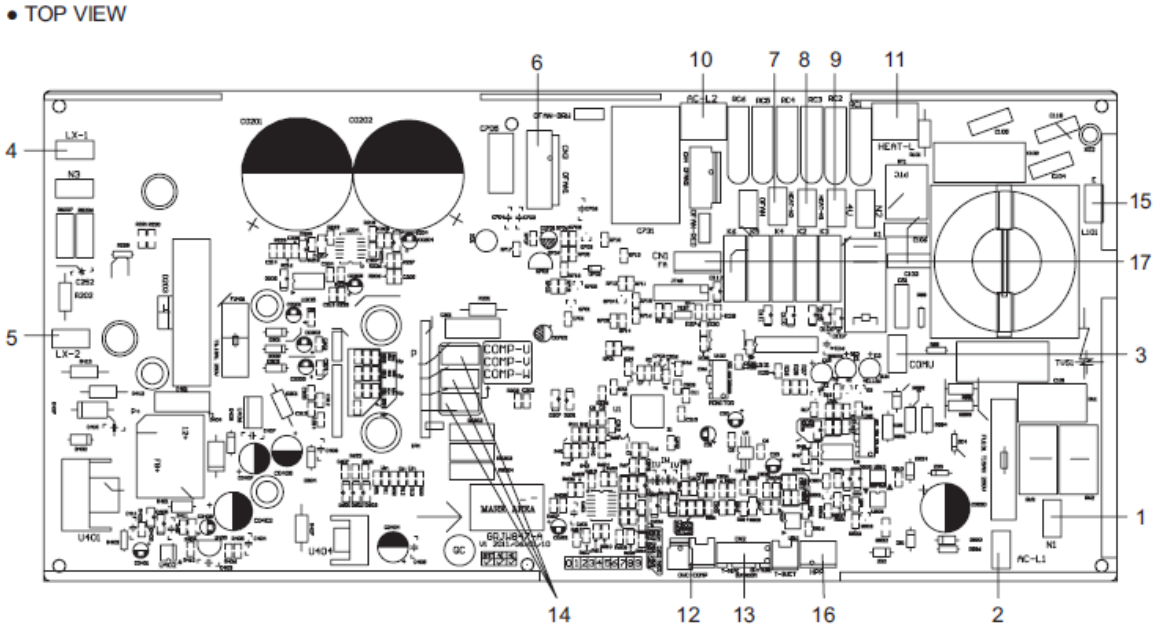


Figure 15: 24K Electrical diagram



4.2- PRINTED CIRCUIT BOARDS

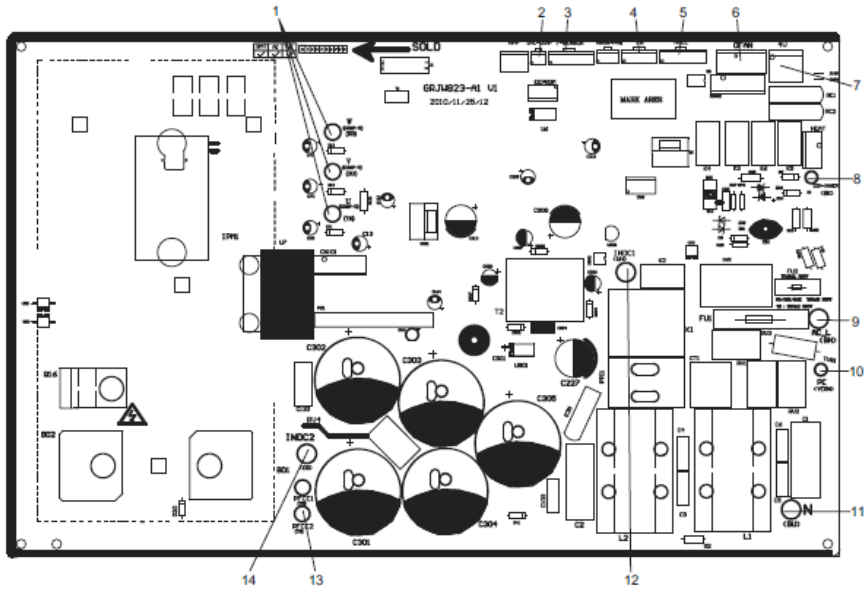
Figure 16: 9/12K Circuit board



1	Input of neutral wire of power	4	Interface 1 of electric reactor	7	Neutral wire of electric heater of chassis	10	Live wire of 4-way valve	13	Temp sensor
2	Input of live wire of power	5	Interface 2 of electric reactor	8	Neutral wire of electric heater of compressor	11	Live wire of electric heater	14	U,V,W three phases of compressor
3	Communication interface	6	Interface of fan	9	Neutral wire of 4-way valve	12	Input of overload	15	Input of ground wire of power
						16	pressure switch input	17	Electron expansion valve

Figure 17: 18K Circuit board

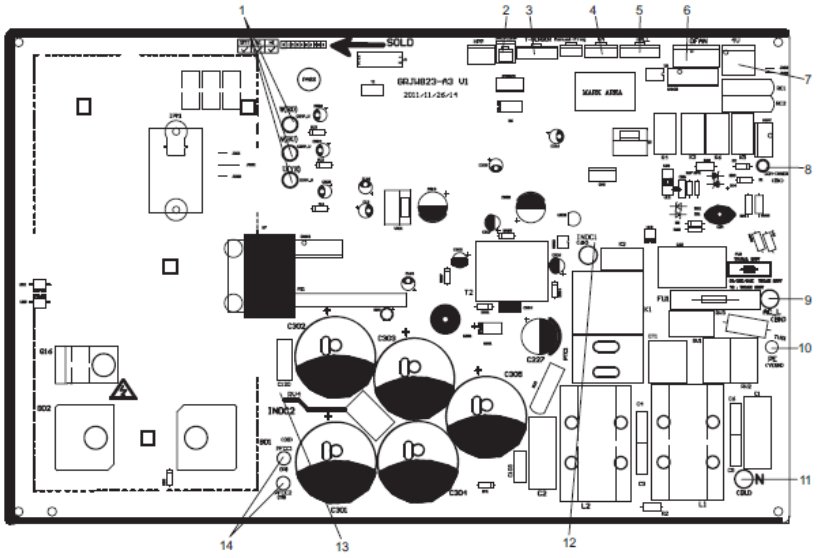
• TOP VIEW



1	Compressor interface	2	Compressor overload protector	3	Temperature sensor	4	Electric expansion valve
5	Fan HALL interface	6	Outdoor fan	7	4-way valve	8	Communication interface with indoor unit
9	Live wire	10	Earthing wire	11	Neutral wire	12	Reactor interface 1
13	PFC capacitor interface 1	14	Reactor interface 2				

Figure 18: 24K Circuit board

• TOP VIEW



No.	Name	No.	Name	No.	Name	No.	Name
1	Connecting wire of compressor	5	HALL terminal	9	Live wire of power supply	13	Wire 2 of electric reactor
2	Interface of overload of compressor	6	Interface of outdoor fan	10	Ground wire	14	Wire of PFC capacitor
3	Terminal of temp sensor	7	Interface of 4-way valve	11	Neutral wire of power supply		
4	Terminal of electronic expansion valve	8	Communication wire to indoor unit	12	Wire 1 of electric reactor		

5- FUNCTIONS AND CONTROL OUTDOOR UNIT

5.1- THERMOSTAT

5.1.1- Communicating thermostat (R02P032)

The unit must be used with the Dettson communicating thermostat (R02P029 or R02P032) in order to work as a fully modulating unit. In this case, the interface card (K03081) will be able to gather information from the outdoor unit, the furnace and the thermostat, making this integrated system very easy to install and increased home owner comfort. The indoor blower speed will be determined by various factors including outdoor temperature, compressor speed and demand from the thermostat. The balance point (temperature at which the unit will switch from heat pump heating to auxiliary heat) will be adjustable through the thermostat. If this unit is destined to be used as a cooling system only, the heat pump feature can also be disabled altogether from the communicating thermostat.
For more details refer to the manual provided with the thermostat.

Auxiliary Heating

Heat pump Disable
This feature is applicable only in the heat pump mode. When this feature is selected, the thermostat will switch to gas or electric heat and shut off the compressor when the outside temperature falls below the HP balance point. In the Thermostat Installer Menu, select the temperature which can be between -15°C (5°F) to 10°C (50°F).

Dual Fuel Disable
This feature is applicable only in the heat pump mode. When this feature is selected, the thermostat will switch to fossil fuel heat and shut off the compressor when the outside temperature falls below the DF balance point. In the Thermostat Installer Menu, select the temperature which can be between -15°C (5°F) to 10°C (50°F).

5.1.2- Legacy thermostat

Shall the unit be controlled by a one or two stage thermostat, the unit will only be able to run as a one or two stage unit. Hence, the indoor blower speed will only be controlled by the air handler, leading to a fixed air flow operation. In this configuration, the balance point can be set using the dipswitches S1-2 to S1-4 (see Table 2). The Auxiliary heat or heat pump function can also be disabled using these same switches.

5.1.2.1 Balance point adjustment

When the dipswitch bank is set accordingly, the interface card will modify the heat source in function of the outdoor temperature. The outdoor unit will send the temperature reading through the serial communication wires (COND1 and COND2), with no need to install a separate temperature sensor. The unit will heat using the heat pump until the outdoor temperature goes below the balance point that was set according to the dipswitch table below.

Table 2: Dipswitch adjustment

DIP1-2	DIP1-3	DIP1-4	Balance point
OFF	OFF	OFF	-4°F(-20°C)
OFF	OFF	**ON**	-17°C
OFF	**ON**	OFF	-14°C
OFF	**ON**	**ON**	-11°C
ON	**OFF**	OFF	-8°C
ON	**OFF**	**ON**	-5°C
ON	**ON**	OFF	-2°C
ON	**ON**	**ON**	Heatpump heat only

5.2- FUNCTION & CONTROL

5.2.1- 09/12K Unit

5.2.1.1 Temperature Parameters

- Indoor thermostat temperature (T_{preset})
- Indoor ambient temperature (T_{amb}.)

Note: $\mathrm{T}_{\text{compensation}}$is determined by indoor and outdoor units. If the indoor unit controls temperature compensation, $\mathrm{T}_{\text{compensation}}$ is determined by the value sent to the outdoor unit by the indoor unit; If it is not controlled by the indoor unit, $\mathrm{T}_{\text{compensation}}$ will be 3°C (37.4°F) as default.

5.2.1.2 Basic Functions

Once energized, in no case should the compressor be restarted within less than 3 minutes. In the situation that memory function is available for the first energization, if the compressor is at stop before de-energization, the compressor will be started with a 3-minute lag; and once started, the compressor will not be stopped within 6 minutes regardless of changes in room temperature;

1. Cooling mode

Working conditions and process of cooling

(1) When $\mathrm{T}_{\text{indoor amb}}.\geq\mathrm{T}_{\text{preset}}$, the unit will enter cooling operation. In that case, the outdoor fan and compressor will operate and the indoor fan will run at pre-set speed ;

(2) When $\mathrm{T}_{\text{indoor amb}} \leq \mathrm{T}_{\text{preset}-2°\text{C (3.6°F)}}$, and compressor has continuously operated at frequency lower than 15Hz (not including 15Hz) for 17 minutes, if $\mathrm{T}_{\text{indoor amb}} = \mathrm{T}_{\text{preset}-2°\text{C (3.6°F)}}$ the compressor will stop operation;

(3) When $\mathrm{T}_{\text{indoor amb.}} \leq \mathrm{T}_{\text{preset}-3°C\,(5.4°F)}$, compressor will stop operations and in 30s later, outdoor fan will stop operation;

(4) When $\mathrm{T}_{\text{preset}-2°\text{C (3.6°F)}} < \mathrm{T}_{\text{indoor amb.}} < \mathrm{T}_{\text{preset}}$, the unit will keep its previous operation.

Protections

- **Antifreeze protection**

Under cooling and dehumidifying mode, 6 minutes after the compressor is started:

(1) If $T_{evap} \leq 2°C\ (35.6°F)$, the compressor will operate at reduced frequency;

(2) If $T_{evap} \leq 1°C\ (30.2°F)$, is detected for 3 minutes continuously, the compressor will stop, and after 30 seconds, the outdoor fan will stop; and under cooling mode, the indoor fan and the swing motor will remain at the original state;

(3) If $T_{evap} \geq 10°C\ (50°F)$, and the compressor has remained at OFF for at least 3 minutes, the compressor will resume its original operation state.

- **Total current up and frequency down protection**

(1) When total current $\mathrm{I}_{\text{total}}$≤6A, increasing frequency is allowed;

(2) When total current $\mathrm{I}_{\text{total}}$≥7A, increasing frequency is prohibited;

(3) When total current $\mathrm{I}_{\text{total}}$≥8A, the unit operates by decreasing frequency.

(4) When total current $\mathrm{I}_{\text{total}}$≥9A, the compressor stops operation, and indoor fan will stop operation after 30s.

2. Heating Mode

Working conditions and process of heating

(1) When $T_{preset} - (T_{indoor\ amb.} - T_{compensation)} \geq 1°C\ (1.8°F)$, the unit will enter heating operation. In that case, compressor, outdoor fan and 4-way valve will operate at the same time.

(2) When $-2°C\ (-3.6°F) < T_{preset} - (T_{indoor\ amb.} - T_{compensation}) < 1°C\ (1.8°F)$, the unit will keep its previous operation status.

(3) When $T_{preset} - (T_{indoor\ amb.} - T_{compensation}) \leq -2°C\ (-3.6°F)$, compressor will stop operation and in 30s later, the outdoor fan will stop operation;

(4) When the unit is turned off at heating mode, or changes to another mode from heating mode, the 4-way valve will be de-energized in 2 minutes later after compressor stops operation (the compressor is operating during heating mode).

(5) When $T_{outdoor\ amb.} > 30°C\ (86°F)$, compressor will stop operation immediately and outdoor fan will stop operation in 30s later.

(6) When the compressor is operating, or changing to heating from cooling, the 4-way valve will be energized in 2-3 minutes later.

Condition and process of defrost

(1) When $T_{outdoor\ amb.} \leq 5°C\ (41°F)$ and compressor has operated for a cumulated time of 3 hours, if $T_{outdoor\ pipe} < 0°C\ (32°F)$, the unit will enter defrosting mode.

Note: the time will be cleared when $Toutdoor\ amb. > 5°C\ (41°F)$, compressor has been started up after changing to cooling mode and defrosting has finished. The time will not be cleared when the unit stops when reaching temperature point, or for protection, changing to fan mode, etc.).

(2) When heating has operated for continuous 45 minutes, or for an accumulated 90 minutes, the unit will enter defrosting mode in 3 minutes after meeting any condition below;

a. $T_{outdoor\ ambient} > 5°C\ (41°F), T_{\ outdoor\ tube} \leq -2°C\ (28.4°F)$;

b. $-2°C\ (28.4°F) \leq T_{outdoor\ ambient} \leq 5°C\ (41°F)$, $T_{\ outdoor\ tube} \leq -6°C\ (21.2°F)$;

c. $-5°C\ (23°F) \leq T_{outdoor\ ambient} < -2°C\ (28.4°F)$, $T_{outdoor\ tube} \leq -8°C\ (17.6°F)$;

d. $-10°C\ (14°F) \leq Toutdoor\ amb. < -5°C\ (23°F)$, $Toutdoor\ pipe - Tcompensation \leq (Toutdoor\ amb. - 3°C\ (5.4°F)$

e. $Toutdoor\ amb. < -10°C\ (14°F)$, $Toutdoor\ pipe - Tcompensation \leq (Toutdoor\ amb. - 3°C\ (5.4°F))$

After energization, for the first defrosting, $T_{Compensation} = 0°C\ (32°F)$; if it is not the first time of defrosting, $Tcompensation$ will be determined by $Toutdoor\ pipe$ when quitting defrosting last time; if $Toutdoor\ pipe > 2°C\ (35.6°F)$, $Tcompensation = 0°C\ (0°F)$; if $Toutdoor\ pipe \leq 2°C\ (35.6°F)$, $Tcompensation = 3°C\ (5.4°F)$.

(3) During defrosting, if operation time for compressor does not reach 3min, the defrosting will not be entered in the subsequent 2 hours. At that time, compressor stops operation and in 30s later, the outdoor fan will stop operation; in another 30s, 4-way valve will stop operation; in 30s later, compressor will increase its frequency for defrosting. When defrosting lasts for 450s, or $Toutdoor\ pipe \geq 10°C\ (50°F)$, compressor will decrease its frequency. In 30s later, compressor will stop operation; in another 30s, 4-way valve will be started up. In 60s later, compressor and outdoor fan will operate. Frequency for defrosting is 85Hz.

Protections: Total current up and frequency down

When total current $Itotal \leq 6A$, increase frequency is allowed; when total current $Itotal \geq 7A$, increasing frequency is prohibited; when total current $Itotal \geq 8A$, the unit operates by decreasing frequency. When total current $Itotal \geq 9A$, the compressor stops operation, and indoor fan will stop operation after 30s.

3. Common Protection Functions and Fault display under COOL and HEAT Modes

Overload protection

$T\ tube$: measured temperature of outdoor heat exchanger under cooling mode; and measured temperature of indoor heat exchanger under heating mode.

(1) Cooling overload

a. If $T\ tubes \leq 52°C\ (125.6°F)$, the unit will return to its original state.

b. If $T\ tubes \geq 55°C\ (131°F)$, frequency rise is not allowed.

c. If $T\ tubes \geq 58°C\ (136.4°F)$, the compressor will run at reduced frequency.

d. If $T\ tube \geq 62°C\ (143.6°F)$, the compressor will stop.

(2) Heating overload

a. If $T\ tubes \leq 50°C\ (122°F)$, the unit will return to n its original operation sate.

b. If $T\ tubes \geq 53°C\ (127.4°F)$, frequency rise is not allowed.

c. If $T\ tubes \geq 56°C\ (132.8°F)$, the compressor will run at reduced frequency.

d. If $T\ tubes \geq 60°C\ (140°F)$, the compressor will stop and the indoor fan will blow residual heat and then stop.

Exhaust temperature protection of compressor

(1) If exhaust temperature ≥98°C (208.4°F), frequency is not allowed to rise.

(2) If exhaust temperature ≥103°C (217.4°F), the compressor will run at reduced frequency.

(3) If exhaust temperature ≥110°C (230°F), the compressor will stop.

(4) If exhaust temperature ≤90°C (194°F) and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.

Communication fault

If the unit fails to receive correct signals for durative 3 minutes, communication fault can be justified and the whole system will stop.

Module protection

Under module protection mode, the compressor will stop. When the compressor remains at stop for at least 3 minutes, the compressor will resume its operation. If module protection occurs six times in succession, the compressor will not be started again.

Overload protection

If temperature sensed by the overload sensor is over 115°C (239°F), the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. If temperature is below 95°C (203°F), the overload protection will be relieved.

DC bus voltage protection

If voltage on the DC bus is below 150V or over 420V, the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. When voltage on the DC bus returns to its normal value and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.

5.2.1.3 Control of outdoor electric Heating Band

If not in heating mode or temp sensor has malfunction, electric heating bands of compressor and of condenser will stop operation, otherwise, the below control logic will be followed.

1. **Control of Compressor electric heating Band**
    a. Conditions for start-up: the compressor is off and meanwhile outdoor ambient temp≤-5°C (23°F);
    b. Conditions for turning off: it will be turned off when meeting any condition below:
        - Compressor is operating
        - Compressor is turned off and meanwhile outdoor ambient temp ≥-2.2°C (28°F);
    c. Outdoor ambient temp sensor has malfunction and electric heater band stops operation.

2. Control of Electric Heater Band of Condenser

a. When $Toutdoor\ amb. \leq 1°C\ (33.8°F)$, electric heater band of condenser will operate.
b. During defrosting process, electric heater band of chassis will operate in 3 min after compressor starts operating. When compressor has operated for 3 min and $Toutdoor\ amb \geq 3°C\ (37.4°F)$, electric heater band will stop operating.
c. When $Toutdoor\ amb. \geq 3°C\ (37.4°F)$, electric heater band of condenser will not operate.
d. When $1°C\ (33.8°F) < Toutdoor\ amb. < 3°C\ (37.4°F)$, electric heater band of condenser will keep its previous status.

When outdoor ambient temp sensor has malfunction, electric heater band stops operation; once electric heater stops operation, it has to wait at least 2 minutes before it can be restarted up again.

5.2.2- 18/24K Unit

❖ Interface card

5.2.2.1 Temperature Parameters

- Indoor pre-set temperature ($Tpreset$)
- Indoor ambient temperature ($Tamb.$)

5.2.2.2 Basic functions

Once the compressor is energized, there should be a minimum interval of 3 minutes between two start-ups. But if the unit is de-energized and then energized, the compressor can restart within 3 minutes.

1. Cooling mode

Cooling conditions and process

(1) When $Tamb. \geq Tpreset$, the unit starts cooling operation. In this case, the compressor and the outdoor fan operate.
(2) When $Tamb. \leq Tpreset - 3°C\ (37.4°F)$, the compressor and the outdoor fan stop.
(3) When Tpreset-3°C (37.4°F)<Tamb.<Tpreset, the unit will maintain its previous running status.

When outdoor unit has malfunction and stops for protection, indoor unit will keep previous operation status.

2. Heating mode

Heating conditions and process

(1) When $Tamb. \leq Tpreset + 2°C\ (3.6°F)$, the unit starts heating operation. In this case, compressor and outdoor fan operate simultaneously; the indoor fan operates at cold-air prevention mode.
(2) When $Tamb. \geq Tpreset + 5°C\ (9°F)$, the compressor and outdoor fan stop operation; the indoor fan blows residual heat.
(3) When $Tpreset + 2°C\ (3.6°F) < Tamb. < Tpreset + 5°C\ (9°F)$, the unit will maintain its previous running status.

Defrosting and oil return

When receiving the signal of defrosting and oil return, indoor fan will stop operation. During defrosting, oil return and 5 minutes after quit, all indoor pipe temperature sensors will not be detected.

Blow residual heat

In heating mode, when temperature reaches the set temperature, the compressor and outdoor fan will stop.
When the unit is in heating mode, and the compressor and indoor fan are operating. If the unit is turned off, the compressor and outdoor fan will stop. Indoor unit will operate at low speed for 10 seconds and then the unit will be turned off.

❖ Outdoor unit

5.2.2.1 Compensation function of input parameters

According to the structure of wall-mounting unit and the comfortability for operation, when the compressor is at OFF status, indoor ambient temperature is higher than set temperature under heating mode.

5.2.2.2 Outdoor discharge temperature sensor

For ensuring the safety and reliability of operation, please insert the outdoor discharge temperature sensor into the corresponding temperature sensor bushing to make sure that the control system can detect system discharge temperature accurately. Otherwise, the unit will stop operation and it displays malfunction of discharge temperature sensor (discharge temperature sensor has not been inserted well).

5.2.2.3 Cooling mode

Working condition and process for cooling

(1) If compressor is at OFF status, and $(T_{preset} - (T_{indoor\ amb.} - \Delta T_{indoor\ amb.compensation\ of\ cooling}))$≤0°C (0°F), the unit operates in cooling mode;
(2) During cooling operation, if 0°C (0°F)≤$(T_{preset} - (T_{indoor\ amb.} - \Delta T_{indoor\ amb.compensation\ of\ cooling}))$<3°C (5.4°F), the unit still operates in cooling mode;
(3) During cooling operation, if 3°C (5.4°F) ≤ $(T_{preset} - (T_{indoor\ amb.} - \Delta T_{indoor\ amb.compensation\ of\ cooling}))$, the unit stops operation when reaching the temperature point in cooling.

5.2.2.4 Defrosting control (heating mode)

(1) If it turns to defrosting time and it detects that the defrosting temperature is satisfied for 3 minutes successively, the unit turns into defrosting process.
(2) Defrosting-starting: compressor stops operation and restart it up after 55s delayed.
(3) Defrosting-ending: compressor stops operation and it starts up after 55s delayed.
(4) When any of below defrosting-ending conditions is satisfied, the unit will quit from defrosting operation :
    - $T_{outdoor\ tube} \geq T_{quit\ temperature\ 1}$ for defrosting;
    - Defrosting operation time is reached at $T_{max\ defrosting\ time}$.

5.2.2.5 Control of compressor

(1) Frequency of compressor controls the frequency according to the relation between ambient temperature and set temperature, and the change speed of ambient temperature.
(2) Under cooling, and heating mode, compressor will be started up after outdoor fan is started for 5s.
(3) At the OFF status, the operation stops immediately because of protection and switchover to fan mode.
(4) Under each mode: once the compressor is started up, it can be stopped only after operation.
(5) Under each mode: once the compressor is stopped, it can be restarted up only after 3 minutes delayed.

5.2.2.6 Control of outdoor fan

(1) When turn off the unit by thermostat, stop operation because of protection or stop operation after reaching the temperature point, outdoor can stop operation only after the compressor is stopped for 1min;
(2) Under fan mode: outdoor fan stops operation.
(3) Defrosting-starting: enter into defrosting. Outdoor fan stops operation after compressor stops for 50s.
(4) Defrosting-ending: quit defrosting. When the compressor stops operation, the outdoor fan operates.

5.2.2.7 Control of 4-way valve

(1) 4-way valve status under cooling and fan modes: OFF;
(2) When the unit turned on and operated in heating mode, the 4-way valve is energized immediately;
(3) If turn off unit or switch to other mode in heating mode, the 4-way valve is de-energized after the compressor stops for 2min;
(4) When the unit is turned off because of each protection, the 4-way valve is de-energized after 4min delayed;
(5) Defrosting-starting: enter into defrosting. After the compressor stops for 50s, the 4-way valve will be de-energized;
(6) Defrosting-ending: quit defrosting. After the compressor stops for 50s, the 4-way valve is energized.

5.2.2.8 Freeze protection

(1) Under cooling mode, if it is detected that $T_{\text{inner tube}}$ <0°C (32°F) for 3min successively, the unit will stop operation due to freeze protection. If $T_{\text{limit temperature of freeze protection}} < T_{\text{inner tube}}$, and compressor stops for 3min, the complete unit can resume operation;
(2) Under cooling mode, if $T_{\text{inner tube}}$ <6°C (42.8°F), the operation frequency of compressor may increase or decrease;
(3) If the unit is stopped because of freeze protection for 6 times successively, it cannot resume operation automatically and the malfunction will be displayed continuously, which can only be resumed by turning thermostat to OFF on heat setting. During operation, if operation time of compressor is over, the times of stop operation because of freeze protection will be cleared. If turn off the unit or switch to fan/heating mode, malfunction and times of malfunction is eliminated immediately.

5.2.2.9 Overload protection

(1) Overload protection under cooling mode: if $T_{\text{overload stop operation temp.in cooling}} \leq T_{\text{outdoor tube}}$, the unit stops operation because of overload in cooling; if $T_{\text{outdoor tube}} < T_{\text{overload limit−frequency temp.in cooling}}$ and the compressor has stopped for 3min, the complete unit can resume operation.
(2) Under cooling mode, if $T_{\text{overload limit−frequency temp.in cooling}} \leq T_{\text{outdoor tube}}$, the frequency of compressor may increase or decrease;
(3) Overload protection under heating mode: if $T_{\text{overload stop operation temp.in herating}} \leq T_{\text{indoor tube}}$, the unit stops operation because of overload in heating; if $T_{\text{indoor tube}} < T_{\text{overload limit frequency temp.in heating}}$ and the compressor has stopped for 3min, the complete unit can resume operation.
(4) Under heating mode, if $T_{\text{overload limit frequency temp.in heating}} \leq T_{\text{indoor tube}}$, operation frequency of compressor may increase or decrease;
(5) If the unit is stopped because of overload protection for 6 times successively, it cannot resume operation automatically and the malfunction will be displayed continuously, which can only be resumed by turning the thermostat to OFF or cooling mode. During operation, if operation time of compressor is over, the times of stop operation because of overload protection will be cleared. If turn the thermostat to OFF or switch to fan/cooling mode, malfunction and times of malfunction is eliminated immediately.

5.2.2.10 Discharge temperature protection of compressor

(1) If $T_{\text{stop operation temp.for discharge}} \leq T_{\text{discharge}}$, the unit stops operation because of discharge protection; if $T_{\text{discharge}} < T_{\text{limit frequency temp.for discharge}}$ and compressor has stopped for 3 min, the complete unit can resume operation;
(2) If $T_{\text{normal speed decrease−frequency for discharge}} \leq T_{\text{discharge}}$, operation frequency of compressor may decrease or increase;
(3) If the unit is stopped because of discharge protection of compressor for 6 times successively, it cannot resume operation automatically, it can only be resumed by pressing ON/OFF button. During operation, if operation time of compressor is over, the times of stop operation because of discharge protection will be cleared. If turn off the unit, or switch to fan mode, malfunction and times of malfunction is eliminated immediately.

5.2.2.11 Current protection function

(1) If 13A≤$I_{\text{AC current}}$, operation frequency of compressor may decrease or increase;
(2) If 17A≤$I_{\text{AC current}}$, the system will stop operation because of overcurrent; the complete unit can resume operation only after the compressor stops for 3min;
(3) If the unit is stopped because of overcurrent for 6 times successively, it cannot resume operation automatically, it can only be resumed by turning thermostat to OFF setting. During operation, if operation time of compressor is over, the times of stop operation because of overcurrent protection will be cleared.

5.2.2.12 Voltage drop protection

During operation of compressor, if the voltage is decreasing quickly, the system may stop operation and voltage drop malfunction is caused. 3min later, the system will be restarted up automatically.

5.2.2.13 Communication malfunction

When it has not received the correct signal from indoor unit from 3min, the unit will stop operation; communication malfunction is eliminated and compressor has stopped for 3min, the complete unit can resume operation.

5.2.2.14 IPM (Intelligent Power Model) protection

After compressor is turned on, if the overcurrent happens for IPM, or control voltage is too low because of abnormal causes, IPM will detect module protection signal immediately. Once it detected the module protection signal, the unit will stop operation because of module protection. If module protection is resumed and compressor has stopped for 3min, the complete unit will resume operation. If the unit is stopped because of module protection for 3 times successively, the unit cannot resume operation automatically unless thermostat is turned to OFF setting. If the operation time for compressor is over, the times of stop operation because of module protection will be cleared.

5.2.2.15 Overheat protection of module

(1) If $T_{\text{normal speed frequency-decreasing temp.of module}} \leq T_{\text{module}}$, the operation frequency of compressor may decrease or increase;

(2) If $T_{\text{stop operation temperature of module}} \leq T_{\text{module}}$, the system will stop operation for protection. If $T_{\text{module}} < T_{\text{freauency-limiting temperature of module}}$ and compressor has stopped for 3minm the complete unit will resume operation.

(3) If the unit is stopped because of overheating of compressor module for 6 times successively, it cannot resume operation automatically, it can be only resumed by turning thermostat to OFF setting. During operation, if operation time of compressor is over, the times of stop operation because of compressor overheating protection will be cleared. If turn off the unit, or switch to fan mode, times of malfunction is eliminated immediately.

5.2.2.16 Overload protection of compressor

(1) If it detected that the overload switch for compressor is open for 3min successively, the complete unit will stop operation for protection;

(2) If overload protection is resumed and compressor has stopped for 3min, the complete unit can resume operation;

(3) If the unit stops operation because of overload protection for compressor for 3 times successively, it cannot resume operation automatically, it can only be resumed by turning thermostat to OFF setting. After compressor has operated for 30min, overload protection times for compressor will be eliminated.

6- INSTALLATION MANUAL

6.1- NOTICES FOR INSTALLATION

⚠ CAUTION

1. This unit must be installed only by authorized qualified technicians according to local and/or government regulations and in compliance with this manual;
2. Warning: before obtaining access to terminals, all supply circuits must be disconnected;
3. The temperature of refrigerant line will be high; please keep the interconnection cable away from the copper tube.

6.2- INSTALLATION SITE INSTRUCTIONS

Proper installation site is vital for correct and efficient operation of the unit. Avoid the following sites where:

1. Strong heat sources, vapours, flammable gas or volatile liquids are emitted;
2. High-frequency electro-magnetic waves are generated by radio equipment, welders and medical equipment;
3. Salt-laden air prevails (such as close to coastal areas);
4. The air is contaminated with industrial vapours and oils;
5. The air contains sulphuric gases such as in hot spring zones;
6. Corrosion or poor air quality exists.

6.3- INSTALLATION SITE OF THE OUTDOOR UNIT

1. Select a site where there is sufficient ventilation;
2. Select a site where there is no obstructions blocking the inlet and outlet;
3. The site should be able to withstand the full weight and vibration;
4. Select a dry place, and do not expose the unit to direct sunlight nor strong winds;
5. Make sure that the outdoor unit is installed in accordance with the installation instructions, and is convenient for maintenance and repair;
6. The maximum height difference between the indoor cooling coil and the outdoor unit is 32,8ft, and the maximum length of the connecting tubing's must not exceed 49,2ft(14.996 m) (09K), 65,6ft(19.995 m) (12K) and 82ft (24.994 m) (18/24K).

6.4- SAFETY PRECAUTIONS FOR ELECTRIC APPLIANCES

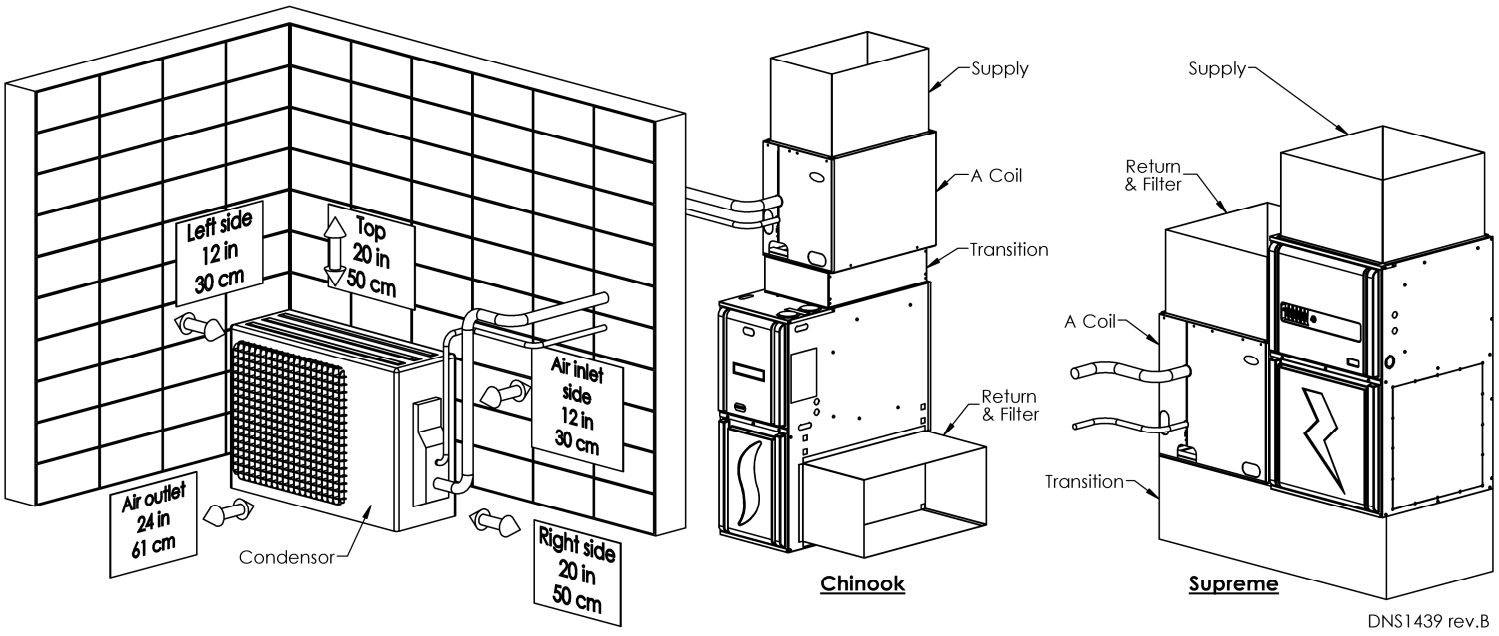
1. A dedicated power supply circuit should be used in accordance with local electrical safety regulations;
2. The unit should be reliably grounded and connected to an exclusive ground device by the professionals;
3. The circuit breaker must have the functions of magnetic dripping and heat dripping to prevent short circuit and overload;
4. The minimum distance between the unit and combustive surface is 4,9 ft.(1.4935 m);
5. The appliance shall be installed in accordance with national wiring regulations:
6. An all-pole disconnection switch with a contact separation of at least 0.1 inch in all poles should be connected in fixed wiring.

6.5- GROUNDING

1. Please ensure that the unit is reliably grounded;
2. The yellow-green wire in the outdoor unit is the grounding wire which cannot be used for the other purposes. Improper grounding may cause electric shock;
3. The ground must have reliable terminal. Please do not connect wire with the following:
    - Water Pipe
    - Gas pipe
    - Sewer pipe
    - Other place that professional personnel consider is unreliable.
4. The model and rated values of fuses should accord with the silk print on fuse cover or related PCB.

6.6- INSTALLATION DRAWING

Figure 19: Installation schematic and clearances



6.7- INSTALLATION OF THE INDOOR COOLING COIL

Check the coil for shipping damage and verify the contents of the box containing the evaporator coil. If you should find damage, immediately contact the last carrier. Coils are shipped with a 10 psi dry air holding charge. Puncture rubber plug on suction line to release charge before removing plugs. The absence of pressure does not verify a leak. Check the coil for leaks before installing or returning it to your wholesaler.

Coil should be level, or pitched slightly toward the drain connection. Airflow face velocity above 350 ft/min is not recommended for downflow or counterflow applications due to potential water blow-off.

For an installation with a **Chinook**, position the coil on the supply outlet of the furnace using sheet metal screws. Drain pans are made of a polymer that can withstand temperatures up to 232.22°C (450°F). Maintain a minimum of 3" clearance over the heat exchanger.

For an installation with a **Supreme**, position the coil on the return outlet of the furnace.

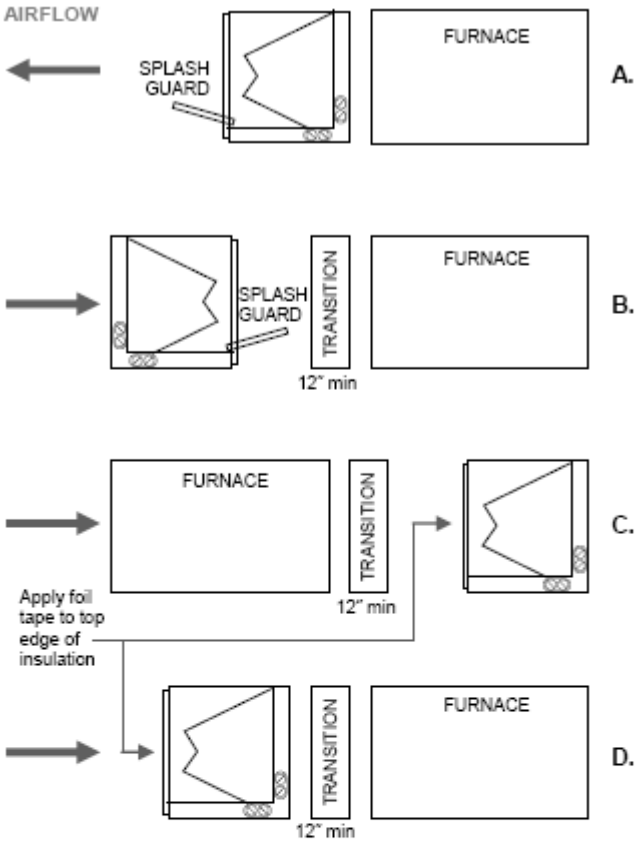
6.7.1- Multiposition coil

Multi-Position A-Coils come factory installed with a vertical and horizontal drain pans and can be configured for upflow, downflow, horizontal blow-through or horizontal pull-through installations. In the center opening of vertical drain pan, a metal Inlet Air Restrictor is factory installed and is required for horizontal applications. It may be removed for vertical applications. Airflow face velocity above 350 ft/min is not recommended for downflow or counterflow applications due to potential water blow-off.

For horizontal configurations, install splashguard (included) onto the coil outlet, and extend suction line insulation into the coil cabinet by 2" to prevent moisture from dripping onto the insulation (the rubber grommet may need to be moved). Splashguard installation is not required for vertical configurations. Bottom flange of guard should rest on pan and sides screwed to the duct flanges. See Figure 21 and Figure 22 for splashguard instructions.

In downflow and counter flow configurations, aluminum foil tape must be applied to seal the top edge of the insulation to the cabinet. This tape will prevent the possibility of the insulation delaminating and blocking airflow. In horizontal pull-through and counter flow configurations, a minimum 12" transition is required in front of the coil as shown in Figure 20. This is required to ensure proper airflow distribution and to reduce pressure drop.

Figure 20: Multiposition configurations



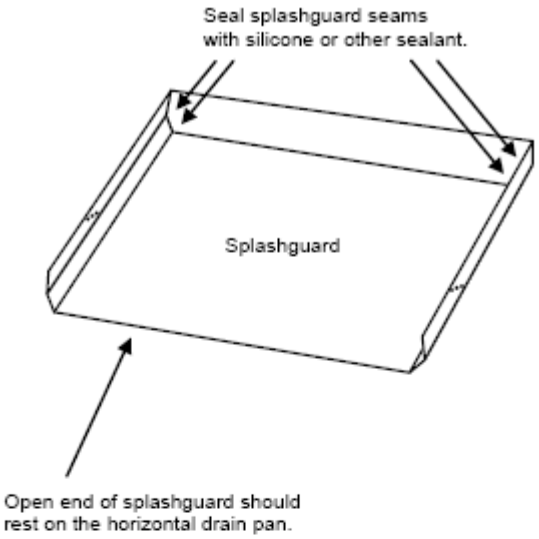
A. **Standard Horizontal Application**
Left hand shown / Right hand similar *(not shown)*
LOWEST STATIC CONFIGURATION
See Spec Guide for additional data

B. **Pull-Through**
Right hand shown / Left hand similar *(not shown)*

C. **Blow-Through (counter flow)**
Left hand shown / Right hand similar *(not shown)*

D. **Pull-Through (counter flow)**
Left hand shown / Right hand similar *(not shown)*

Figure 21: Splashguard without front slope



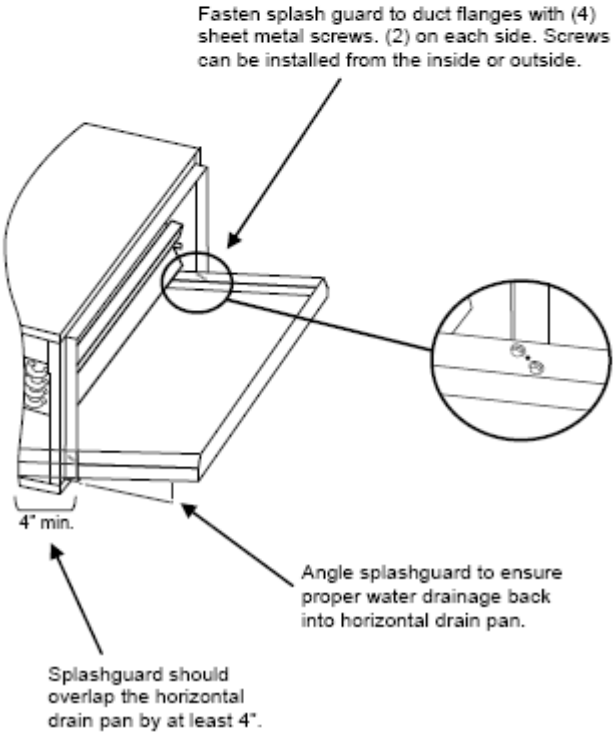
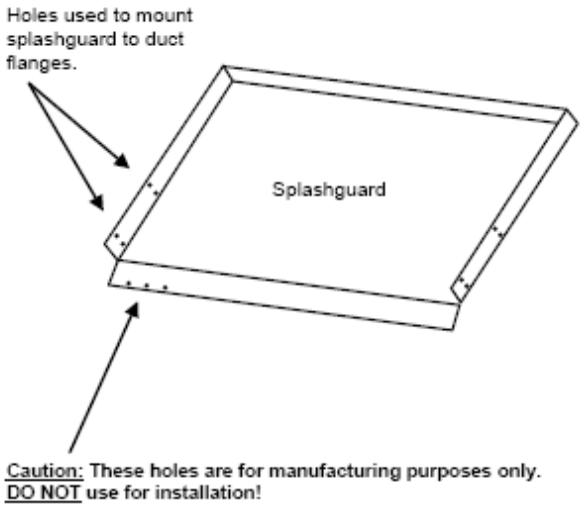
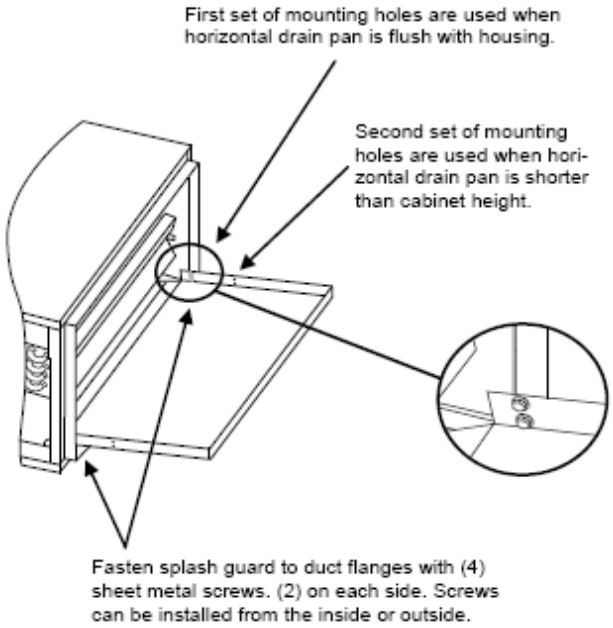


Figure 22: Splashguard with front slope





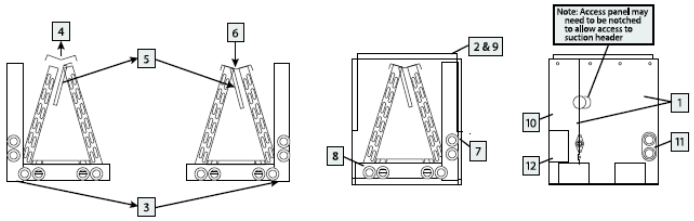
6.7.2- Multiposition (field conversion)

Field Conversion Instructions from Left-to-Right or Right-to-Left Airflow

FOR EACH STEP, REFER TO FIGURE 23:

1- Remove front panels.
2- Remove the top tie bar and pull the coil assembly from the housing.
3- Remove the horizontal drain pan, and re-install it to the opposite side of the coil (Note: horizontal drain pan must have drain plugs tightly closed in the rear of the unit).
4- Remove the top plate.
5- Remove the water diverter, and re-install it to the opposite slab (Note: If water diverter is attached by screws, remove screws, and bend tab straight or cut tab off).
6- Replace the top plate, and apply sealant to seal any air gaps.
7- Before re-inserting the coil assembly, cut the front flange on the housing and fold it back to allow access to the horizontal drain connections (Note: Copy the factory cut-out on the opposite side of the housing).
8- Slide the coil assembly back into the housing (Note: If unit is equipped with a sheet metal spacer, it must be moved to the opposite side of the housing).
9- Re-install the piping panel to the housing.
10- Cut a hole in the access panel to allow access to the horizontal drain connections, and re-install the access panel to the housing (Note: Access panel may need to be notched to allow access to suction header).
11- Seal unused condensate drain connection cut-out holes in the front panel to prevent air leakage.

Figure 23: Multiposition field conversion



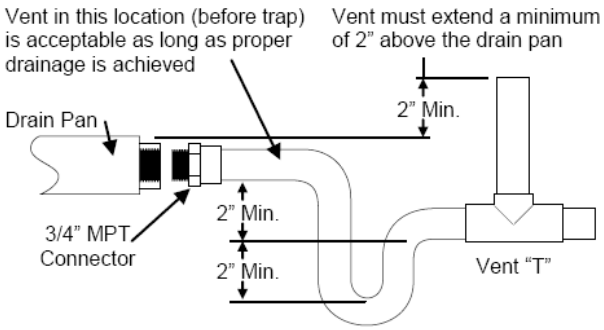
6.7.3- Condensate drain

Coils are equipped with multiple drain connections. Determine the drain connections to be used and note the difference between the primary (green) and secondary (red) openings. Drain plugs are provided for all openings; remove and discard the appropriate plugs with ½" drive ratchet and verify that remaining plugs are tight (2.5 ft-lbs). Attach drain line to pan with ¾" male pipe thread PVC fittings. Hand tight is adequate – do not over tighten & do not reduce drain line size!

Route drain line(s) line so they will not be exposed to freezing temperatures and do not interfere with accessibility to the coil, air handling system or filter. The drain should be pitched downward 1" per 10' with a 2" trap as close to the coil as possible. If line makes a second trap, or has an extended run before termination, a vent tee should be installed after the trap closest to the pan. See Figure 24

If the coil is located in or above a living space where damage may occur from condensate overflow, a separate ¾" drain must be provided from the secondary drain connection. Run this drain to a place in compliance with local installation codes where it will be noticed when unit is operational. Condensate flowing from the secondary drain indicates a plugged primary drain. Prime the trap with water. Test line for leaks. Test water flow with unit in operation. An auxiliary drain pan should also be installed under the unit as specified by most local building codes.

Figure 24: Condensate drain



6.8- INSTALLATION OF INTERFACE CARD

Installation of the interface card is made easy on the Dettson's Chinook and Supreme furnaces. Installation port has been designed on these furnaces. See Figure 25 and Figure 26 for proper location and attachment.
See electrical diagrams, Figure 13, Figure 14 and Figure 15 for proper connections with thermostat, furnace and outdoor unit.
For all other brand of furnaces, see Figure 28 for proper connections.
Note that the performance of the outdoor unit will be affected and will not modulate.

QUICK SETUP

Simple start-up using communicating thermostat with modulating furnace

1. Turn off the breaker of the outdoor unit and the furnace
2. Connect COND1 and COND2 on the interface card to N(1) and 2 at the outdoor unit (See Figure 13 to Figure 15)
3. Connect the RJ-11 wire between the interface and the furnace control board (See Figure 13 to Figure 15)
4. Position the temperature sensor (included) on the crossover of the indoor coil and connect it to the terminal T1 and Tc of the interface (See section 6.8.1-)
5. Turn the outdoor unit "ON"
6. Turn the furnace "ON"

Make sure the unit is working properly

1. The Green LED on the interface card should be blinking once every two seconds
2. The Orange LED on the interface card should be blinking once every two seconds
3. The communicating thermostat will display "Heat Pump Found"
4. Set the thermostat to "COOL" mode and adjust the set point to a lower value than the actual room temperature
5. The furnace and the outdoor unit should start within 5 minutes

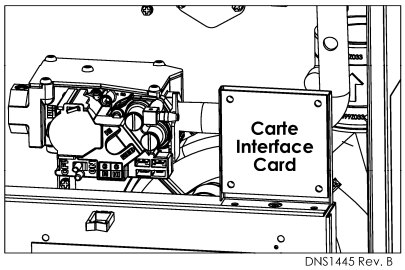
In this configuration, the interface card will gather information from both the outdoor unit and the furnace in order to adjust the fan speed to the capacity of the outdoor unit

Legacy connection

1. Connect all the thermostat control wires to the interface card and the air handler control board (See Figure 28)
2. Make sure to connect the heat output W1 out and W2 out of the thermostat to the W1 and W2 inputs of the furnace – OR – W on W2 on a single stage thermostat
3. Connect COND1 on the interface card to N(1) at the outdoor unit (See Figure 28) and connect COND2 on the interface card to N(2) at the outdoor unit
4. Set the dipswitches to the desired balance point (See Table 2)

Figure 25: Chinook gas furnace

Chinook 15k-30k-45k-105k-120k



Chinook 60k-75k

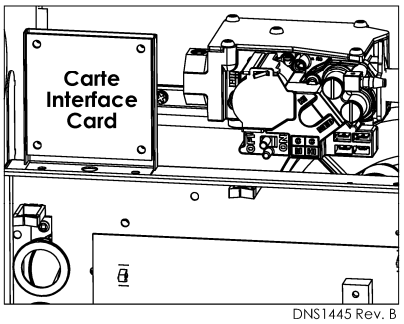
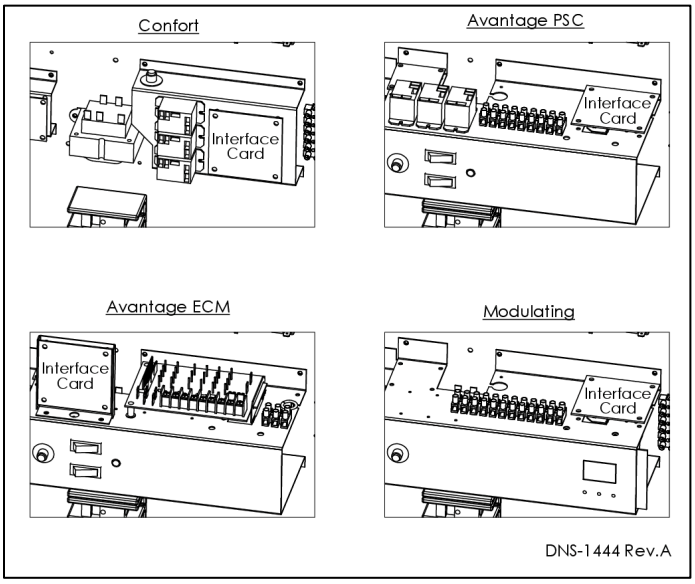


Figure 26: Supreme electric furnace

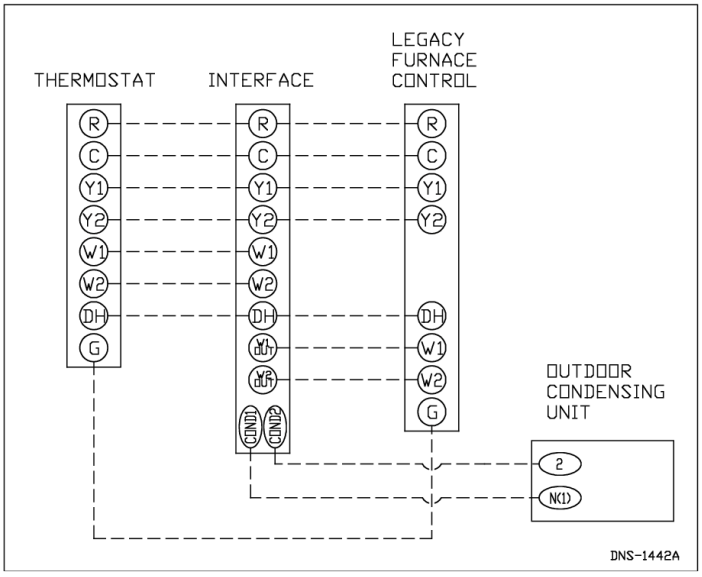


6.8.1- Evaporator temperature sensor installation

1- Attach the provided temperature sensor to the evaporator coil as shown
2- Get the wire through the refrigerant line opening
3- Cut the wire and skin the conductors. Add wire length if necessary
4- Connect the two conductors to T1 and TC on the interface card. The polarity is not important

Figure 27: Evaporator Temperature Sensor

Figure 28: Legacy furnace or air handler



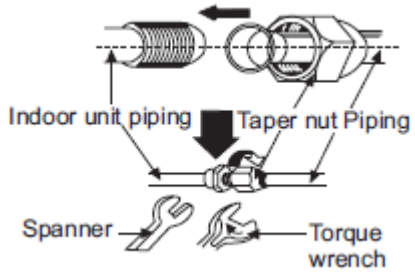
6.9- INSTALLATION OF CONNECTION PIPE

Align the center of the pipe flare with the relevant valve.
Screw in the flare nut by hand and then tighten the nut with spanner and torque wrench referring to the following;

Table 3: Tubing torque tightening

Tube diameter	Tightening torque,approximate(N·m)
Φ6.35(1/4")	14～18N·m(140-180kgf.cm)
Φ9.52(3/8")	34～42N·m(340-420kgf.cm)
Φ12.7(1/2")	49～61N·m(490-610kgf.cm)
Φ15.88(5/8")	68～82N·m(680-820kgf.cm)

Figure 29: Tubing tightening



6.10- INSTALLATION OF THE OUTDOOR UNIT

6.10.1- Electrical wiring

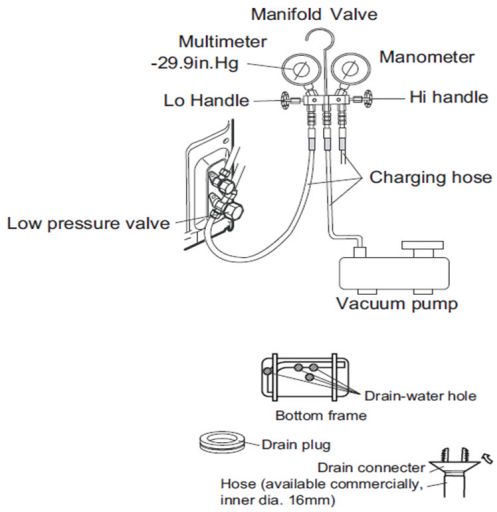
1. Remove the handle on the right side plate of outdoor unit;
2. Remove cord anchor. Connect and fasten power connection cord to the terminal board;
3. Secure the power connection cord cord anchor;
4. Make sure the wires have been fastened properly.

NOTE: Incorrect wiring may cause malfunction.

After the wires have been fastened, ensure there is free space between the connection and fastening places on the main wire.

6.10.2- Air purging and leakage test

1. Connect charging hose of manifold valve to charge end of low pressure valve (both high/low must be tightly shut);
2. Connect joint of charging hose to vacuum pump;
3. Fully open the handle of Lo manifold valve;
4. Open the vacuum pump for vacuumization. At the beginning, slightly loosen joint nut of low pressure valve to check if there is air entering. Then, tighten the nut;
5. Keep evacuating for more than 15 min. and make sure the reading of multi-meter is -1,0x10^5 pa(-76 cmHg);
6. Fully open high/low pressure valves;
7. Remove charging hose from charging end of low pressure valve;
8. Tighten bonnet of low pressure valve. (as shown below)



6.10.3- Outdoor unit condensate drainage

During heating operation, the condensate and defrosting water should be drained through the drain hose. Install the outdoor drain connector in a ϕ.98in hole on the base plate, and attach the drain hose to the connector so that the waste water formed in the outdoor unit can be drained. The hole ϕ 0.98 must be plugged. Whether to plug other holes or not will be determined by the technician.

6.10.4- Check after installation and test operation

Items to be checked	Possible malfunction
Has the unit been fixed firmly?	The unit may drop, shake or emit noise.
Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating).
Is thermal insulation sufficient?	It may cause condensation.
Is water drainage satisfactory?	It may cause water leakage
Is the voltage in accordance with the rated voltage marked on the nameplate?	It may cause electric malfunction or damage the unit.
Is the electric wiring or piping connection installed correctly and securely?	It may cause electric malfunction or damage parts.
Has the unit been securely grounded?	It may cause electrical leakage.
Is the inlet or outlet blocked?	It may cause insufficient cooling (heating).
Is the length of connection pipes and refrigerant capacity been recorded?	The refrigerant capacity is not accurate.

6.10.5- Operation test

Before operation test:

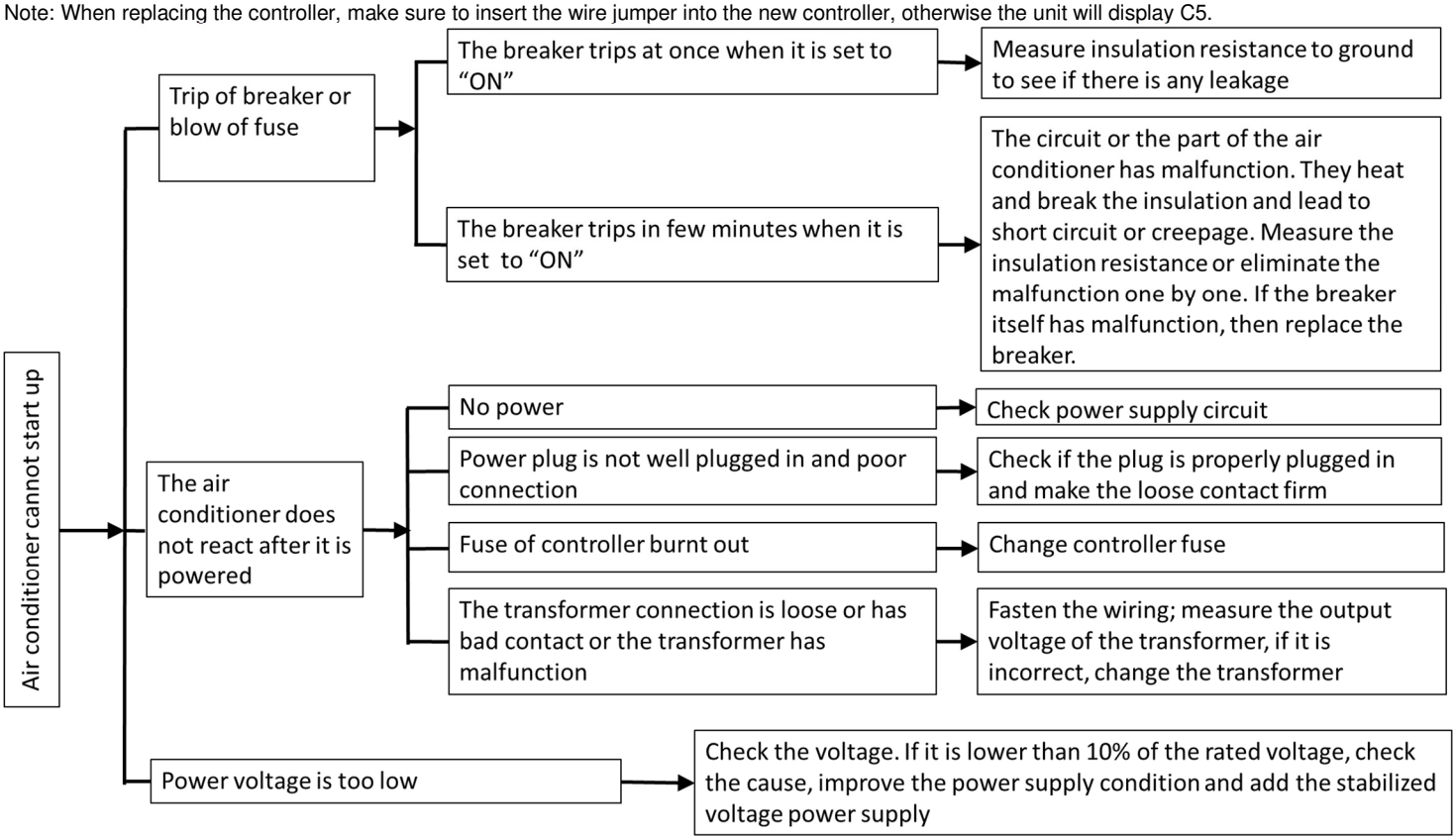
1. Do not switch on power before installation is completely finished;
2. Electric wiring must be connected correctly and securely;
3. Cut-off valves of the connection pipes should be opened;
4. All the impurities such as scraps and thrums must be cleared from the unit.

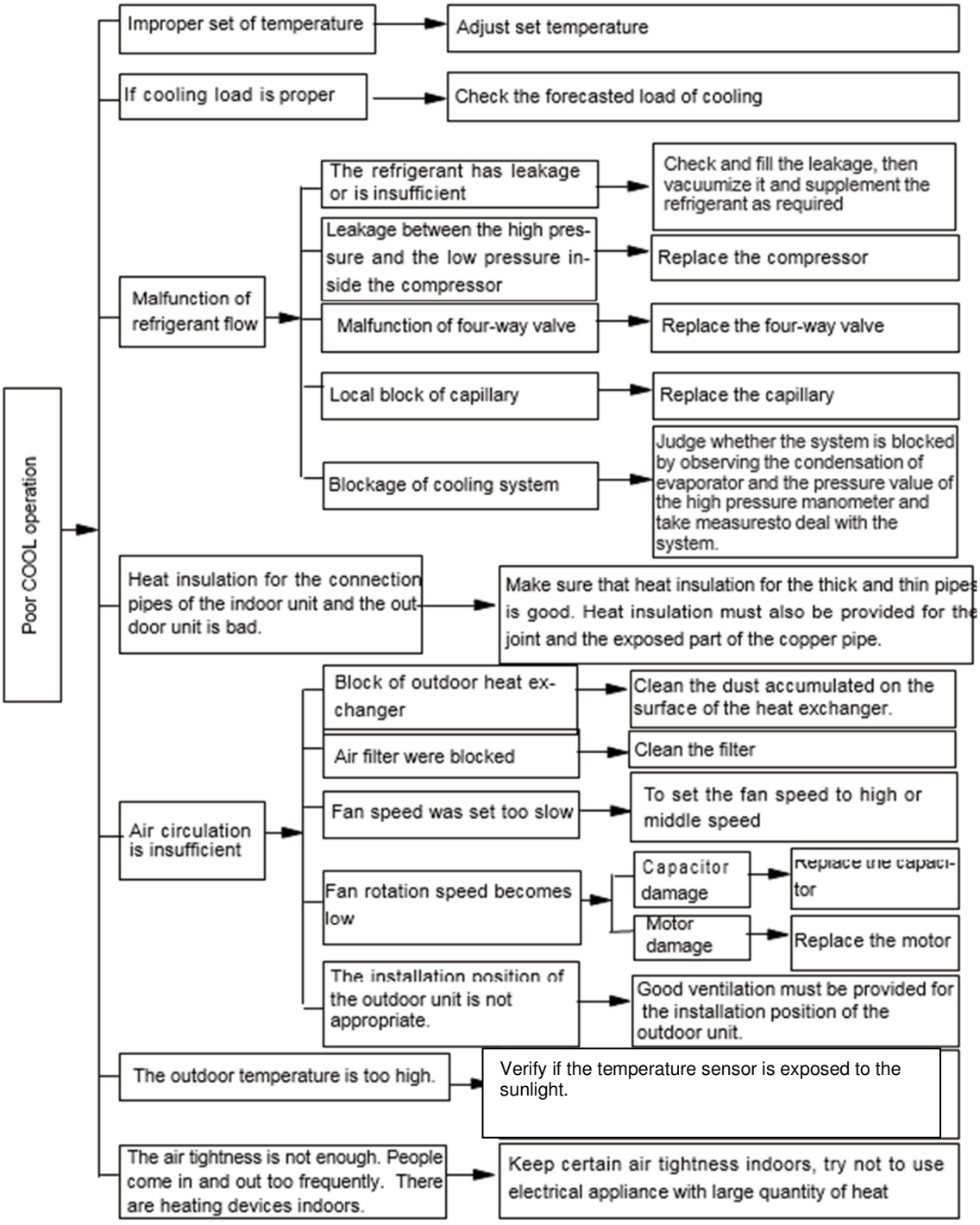
Operation test method:

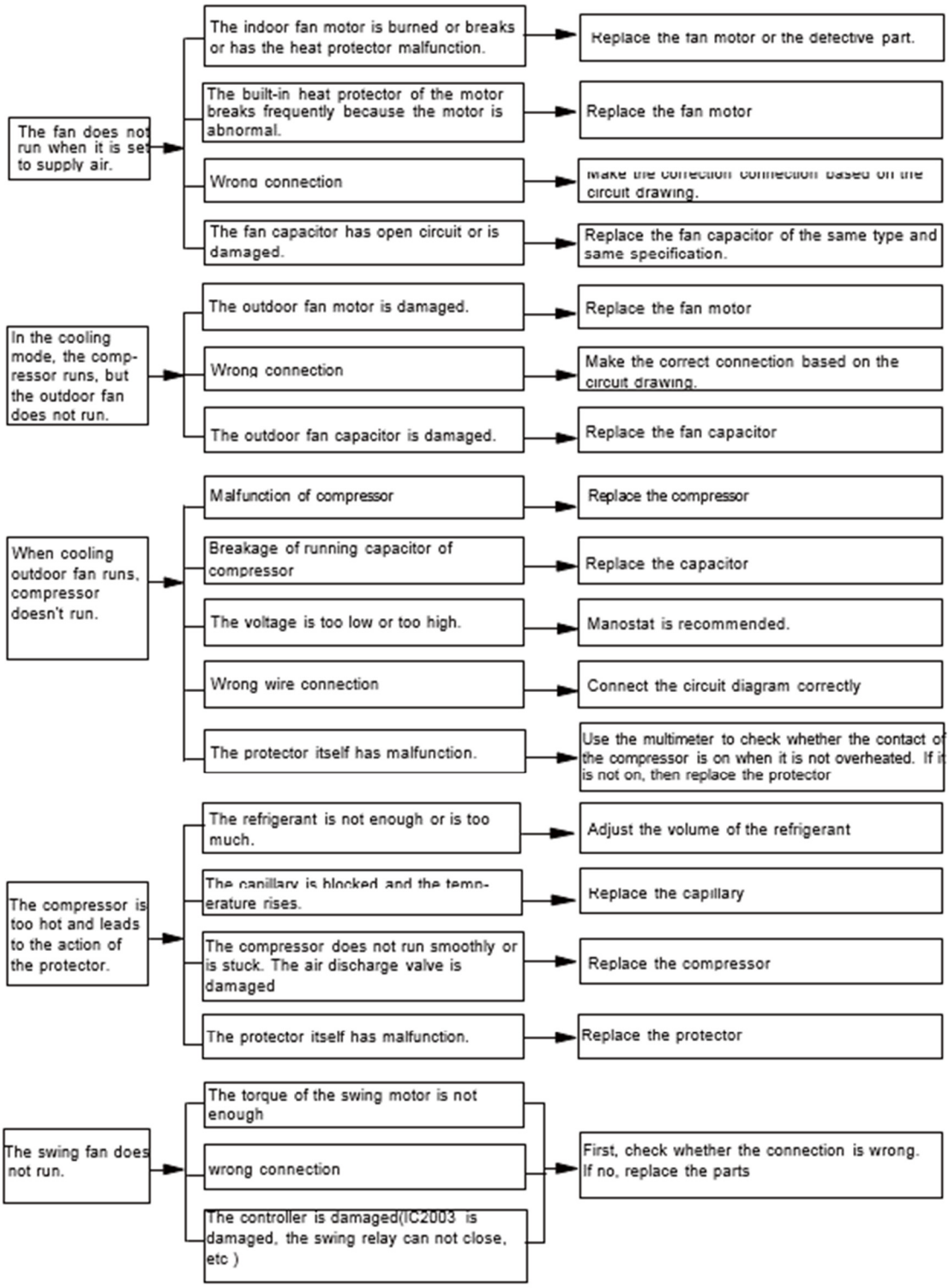
Switch on power and call for heating or cooling on thermostat to check whether the operation is normal or not.

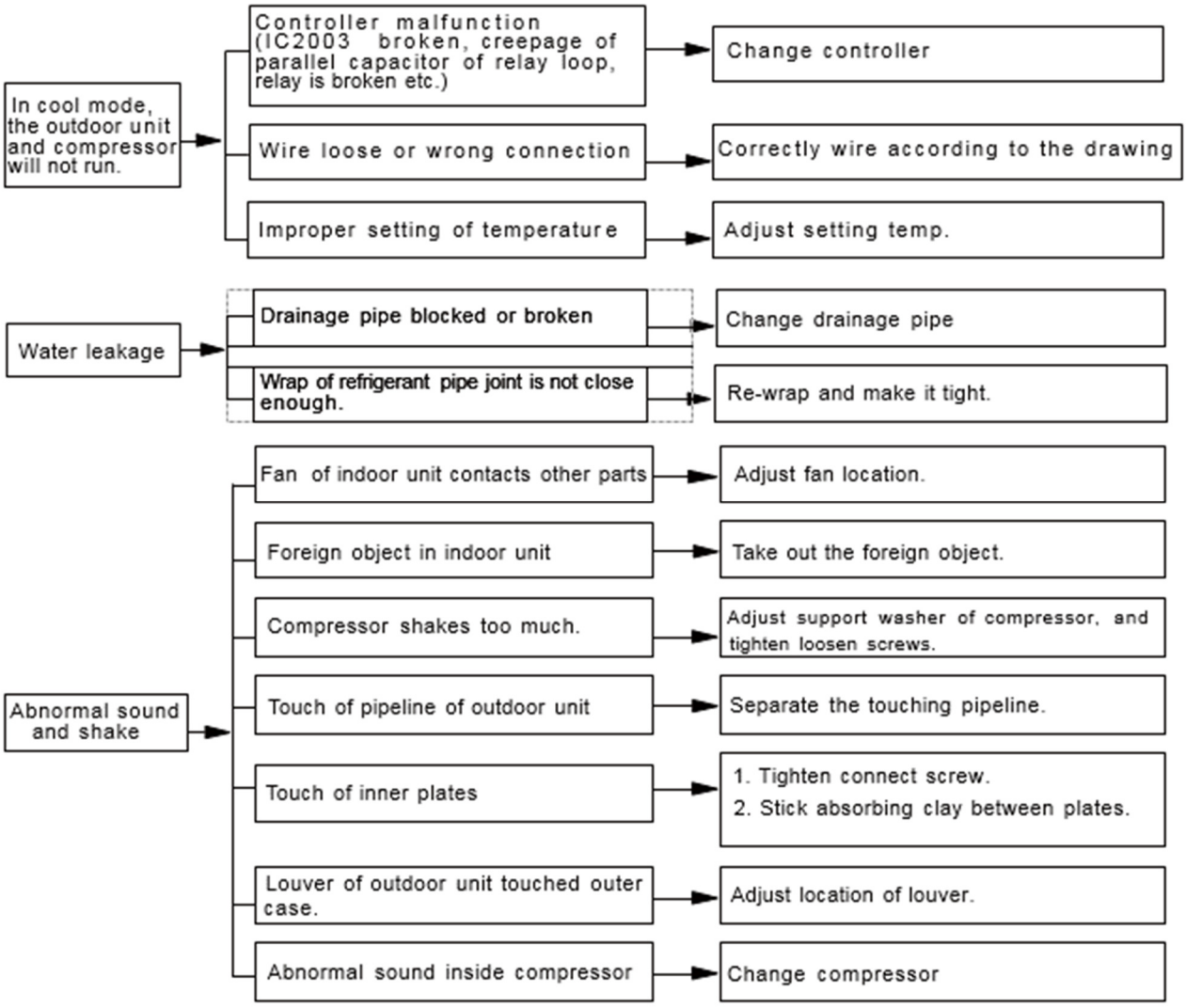
7- TROUBLESHOOTING

Note: When replacing the controller, make sure to insert the wire jumper into the new controller, otherwise the unit will display C5.




Poor COOL operation
Improper set of temperature
Adjust set temperature
If cooling load is proper
Check the forecasted load of cooling
Malfunction of refrigerant flow
The refrigerant has leakage or is insufficient
Check and fill the leakage, then vacuumize it and supplement the refrigerant as required
Leakage between the high pressure and the low pressure inside the compressor
Replace the compressor
Malfunction of four-way valve
Replace the four-way valve
Local block of capillary
Replace the capillary
Blockage of cooling system
Judge whether the system is blocked by observing the condensation of evaporator and the pressure value of the high pressure manometer and take measuresto deal with the system.
Heat insulation for the connection pipes of the indoor unit and the outdoor unit is bad.
Make sure that heat insulation for the thick and thin pipes is good. Heat insulation must also be provided for the joint and the exposed part of the copper pipe.
Air circulation is insufficient
Block of outdoor heat exchanger
Clean the dust accumulated on the surface of the heat exchanger.
Air filter were blocked
Clean the filter
Fan speed was set too slow
To set the fan speed to high or middle speed
Fan rotation speed becomes low
Capacitor damage
Replace the capacitor
Motor damage
Replace the motor
The installation position of the outdoor unit is not appropriate.
Good ventilation must be provided for the installation position of the outdoor unit.
The outdoor temperature is too high.
Verify if the temperature sensor is exposed to the sunlight.
The air tightness is not enough. People come in and out too frequently. There are heating devices indoors.
Keep certain air tightness indoors, try not to use electrical appliance with large quantity of heat


The fan does not run when it is set to supply air.
The indoor fan motor is burned or breaks or has the heat protector malfunction.
Replace the fan motor or the defective part.
The built-in heat protector of the motor breaks frequently because the motor is abnormal.
Replace the fan motor
Wrong connection
Make the correction connection based on the circuit drawing.
The fan capacitor has open circuit or is damaged.
Replace the fan capacitor of the same type and same specification.
In the cooling mode, the compressor runs, but the outdoor fan does not run.
The outdoor fan motor is damaged.
Replace the fan motor
Wrong connection
Make the correct connection based on the circuit drawing.
The outdoor fan capacitor is damaged.
Replace the fan capacitor
When cooling outdoor fan runs, compressor doesn't run.
Malfunction of compressor
Replace the compressor
Breakage of running capacitor of compressor
Replace the capacitor
The voltage is too low or too high.
Manostat is recommended.
Wrong wire connection
Connect the circuit diagram correctly
The protector itself has malfunction.
Use the multimeter to check whether the contact of the compressor is on when it is not overheated. If it is not on, then replace the protector
The compressor is too hot and leads to the action of the protector.
The refrigerant is not enough or is too much.
Adjust the volume of the refrigerant
The capillary is blocked and the temperature rises.
Replace the capillary
The compressor does not run smoothly or is stuck. The air discharge valve is damaged
Replace the compressor
The protector itself has malfunction.
Replace the protector
The swing fan does not run.
The torque of the swing motor is not enough
wrong connection
The controller is damaged(IC2003 is damaged, the swing relay can not close, etc)
First, check whether the connection is wrong. If no, replace the parts

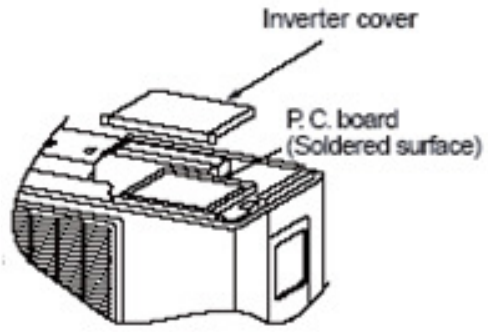

In cool mode, the outdoor unit and compressor will not run.
Controller malfunction (IC2003 broken, creepage of parallel capacitor of relay loop, relay is broken etc.)
Change controller
Wire loose or wrong connection
Correctly wire according to the drawing
Improper setting of temperature
Adjust setting temp.
Water leakage
Drainage pipe blocked or broken
Change drainage pipe
Wrap of refrigerant pipe joint is not close enough.
Re-wrap and make it tight.
Abnormal sound and shake
Fan of indoor unit contacts other parts
Adjust fan location.
Foreign object in indoor unit
Take out the foreign object.
Compressor shakes too much.
Adjust support washer of compressor, and tighten loosen screws.
Touch of pipeline of outdoor unit
Separate the touching pipeline.
Touch of inner plates
1. Tighten connect screw.
2. Stick absorbing clay between plates.
Louver of outdoor unit touched outer case.
Adjust location of louver.
Abnormal sound inside compressor
Change compressor

7.1- PRECAUTIONS BEFORE PERFORMING INSPECTION OR REPAIR

- Be cautious during installation and maintenance. Follow the codes and regulations to avoid electric shock and casualty or even death. Static maintenance is the maintenance during de-energization of the heat pump.
- For static maintenance, make sure that the unit is de-energized.
- Dynamic maintenance is the maintenance during energization of the unit.
- Before dynamic maintenance, check the electricity and ensure that there is ground wire on the site.
- Take sufficient care to avoid directly touching any of the circuit parts without first turning OFF the power.

NOTE: A large capacity electrolytic capacitor is used in the outdoor unit controller (inverter). Therefore, if the power supply is turned OFF, charge (charging voltage DC280V to 380V) remains and discharging takes a lot of time. After turning off the power, if touching the charging section before discharging, an electrical shock may be caused. Discharge the electrolytic capacitor completely.

Remove the inverter cover



7.2- VERIFICATION

(1) Verify the power supply

Confirm that the circuit breaker is in the ON position

(2) Confirmation of power voltage

Confirm that power voltage is AC 208-230 ± 10 %. If power voltage is not in this range, the unit may not operate normally.

7.3- MALFUNCTION & STATUS CODES OF THE INTERFACE CARD FLASHING LEDS

Locate the various colored LEDs on the interface card on the figure below:

Figure 30: Interface card

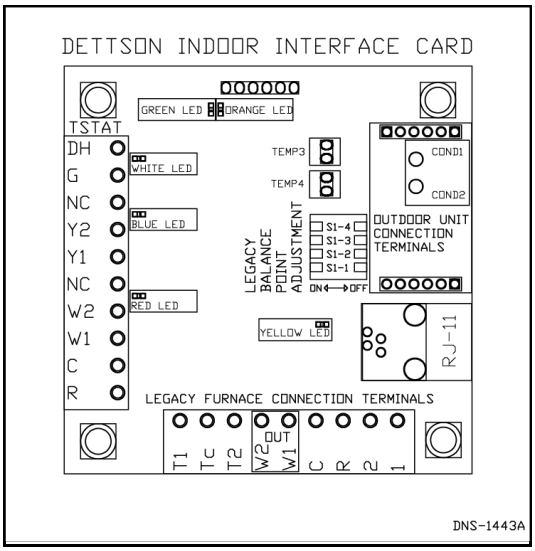


Table 4: Malfunction and status display of interface card

LED COLOR	Blinking	ON	OFF	Cause (If abnormal)	Solution
Green	The interface card is powered up and is trying to communicate with the outdoor unit (Normal)	The interface has stopped operation	The interface has stopped operation	- The supply voltage is too low - An high voltage or EMI event occurred	- Make sure 24VAC are reaching the R-C connections - Verify the connections - Cycle the power
Orange	The interface is communicating with the outdoor unit (Normal)	The interface does not receive communication signals from the outdoor unit	The interface does not receive communication signals from the outdoor unit	- The units are not connected properly	- Make sure the connections are made as per Figure 13, Figure 14 and Figure 15 - Cycle the power of both units
Yellow	When communicating properly with the communicating furnace, this LED should be blinking by short bursts (Normal with communicating installations)	If the LED is ON most of the time and it turns OFF for very short periods, the “1” and “2” wires are most likely reversed	The interface does not communicate with the modulating furnace (Normal when legacy wiring is used)	- If the installation is communicating and the LED is ON most of the time and the it turns OFF for very short periods, the “1” and “2” wires are most likely reversed	- Turn off the power of both the furnace and the outdoor unit and invert the “1” and “2” wires - Turn both units “ON”
Blue	NA	Legacy thermostat is calling for cooling	Legacy thermostat is not calling for cooling	- If the LED has an abnormal behavior	- Check the thermostat wiring
Red	NA	Legacy thermostat is calling for heating	Legacy thermostat is not calling for heating	- If the LED has an abnormal behavior	- Check the thermostat wiring
White	NA	Legacy thermostat is calling for cooling. No communication with the furnace.	Legacy thermostat is not calling for cooling (Normal with installations that communicate)	- If the LED has an abnormal behavior	- Check the thermostat wiring

7.4- MALFUNCTION & STATUS CODES OF THE OUTDDOR UNIT FLASHING LEDS

Table 5: Malfunction and status display of outdoor unit 9/12K

	Malfunction name	Error codes of outdoor unit flashing LEDs	
		Status of Led Lamp	
		Yellow LED lamp	Red LED lamp
Outdoor Unit	Outdoor ambient temps sensor has open or short circuit		Blinks for 6 times
	Outdoor middle pipe temps sensor of condenser has open or short circuit		Blinks for 5 times
	Outdoor discharge temps sensor has open or short circuit		Blinks for 7 times
	Module temperature protection	Blinks for 10 times	
	Lack of refrigerant or block protection for the system (not applicable to residential air conditioner)		Blinks for 9 times
	Thermal overload protection for compressor	Blinks for 8 times	
	Oil return under defrosting or heating	Blinks twice	
	High discharge temperature protection of compressor	Blinks for 7 times	
	Overload protection	Blinks for 6 times	
	Overcurrent protection for the complete unit	Blinks for 5 times	
	Module current protection (IPM protection)	Blinks or 4 times	
	Over low voltage protection for DC bus bar	Blinks for 12 times	
	Over high voltage protection for DC bus bar	Blinks for 13 times	
	PFC protection	Blinks for 14 times	
	Frequency limit/decrease for current protection of the complete unit		Blinks once
	Frequency limit/decrease for high discharge temperature		Blinks twice
	Frequency limit/decrease for freeze protection		Blinks for 4 times
	Frequency limit/decrease for overload		Blinks for 3 times
	Frequency limit/decrease for module temperature protection		Blinks for 11 times
	Freeze protection	Blinks for 3 times	
	Reading malfunction of EEPROM	Blinks for 11 times	
	Reaching temperature for turning on the unit		Blinks for 8 times
	Frequency limit (power)		Blinks for 13 times
	Malfunction of outdoor fan		Blinks for 14 times
	Remark: the lamps blink 0.5 sec on, 0.5 off. Between 2 error cycles it will be 2sec off interval.		

If malfunction occurs, corresponding code will display and the unit will resume normal until protection or Malfunction disappears.

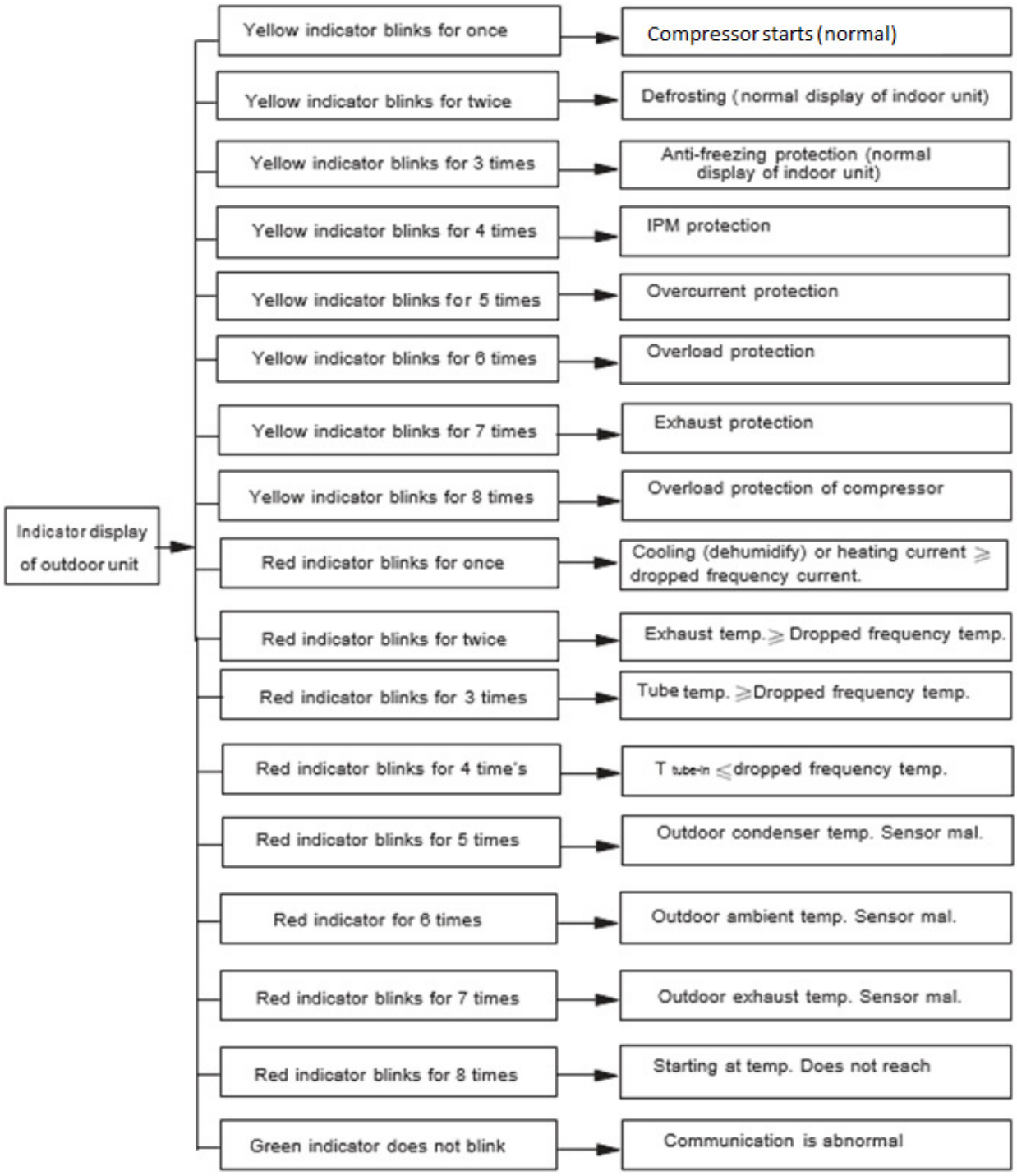


Table 6: Malfunction and status display of outdoor unit 18/24K

Malfunction's name	Display method of Outdoor Unit (indicator has 3 kinds of display status and they will be displayed circularly every 5 s.) □ = OFF ■ = Illuminated ☆ = Blink				A/C Status	Possible Causes
	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
High pressure protection of system	□	☆	☆	☆	During operation, the complete unit stops.	Possible reasons: 1- Refrigerant was superabundant; 2- Pour heat exchange (including filth blockage of heat exchanger and bad radiating environment): Return temperature is too high.
Anti-freezing Protection	■	□	■	□	During cooling and dehumidifying operation, compressor and outdoor fan stop while indoor fan operates.	1- Poor air-return in indoor unit; 2- Fan speed is abnormal; 3- Evaporator is dirty.
High discharge temperature protection of compressor	■	□	■	☆	During cooling and dehumidifying operation, compressor and outdoor fans stop while indoor fans operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
Overcurrent protection	□	■	☆	□	During operation, the complete unit stops.	1 Supply voltage is unstable; 2 Supply voltage is too low and loads is too high; 3 Evaporator is dirty
Communication malfunction	□	□	□	☆	During operation, the complete unit stops.	Refer to the corresponding malfunction analysis
High temperature resistant protection	■	□	■	■	During cooling and heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant)
Outdoor ambient temperature sensor is open/short circuited	□	□	☆	■	During operation, the complete unit stops.	Outdoor temperature sensor has not been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor.
Outdoor condenser temperature sensor is open/short circuited	□	□	☆	□	During operation, the complete unit stops.	Outdoor temperature sensor has not been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor.

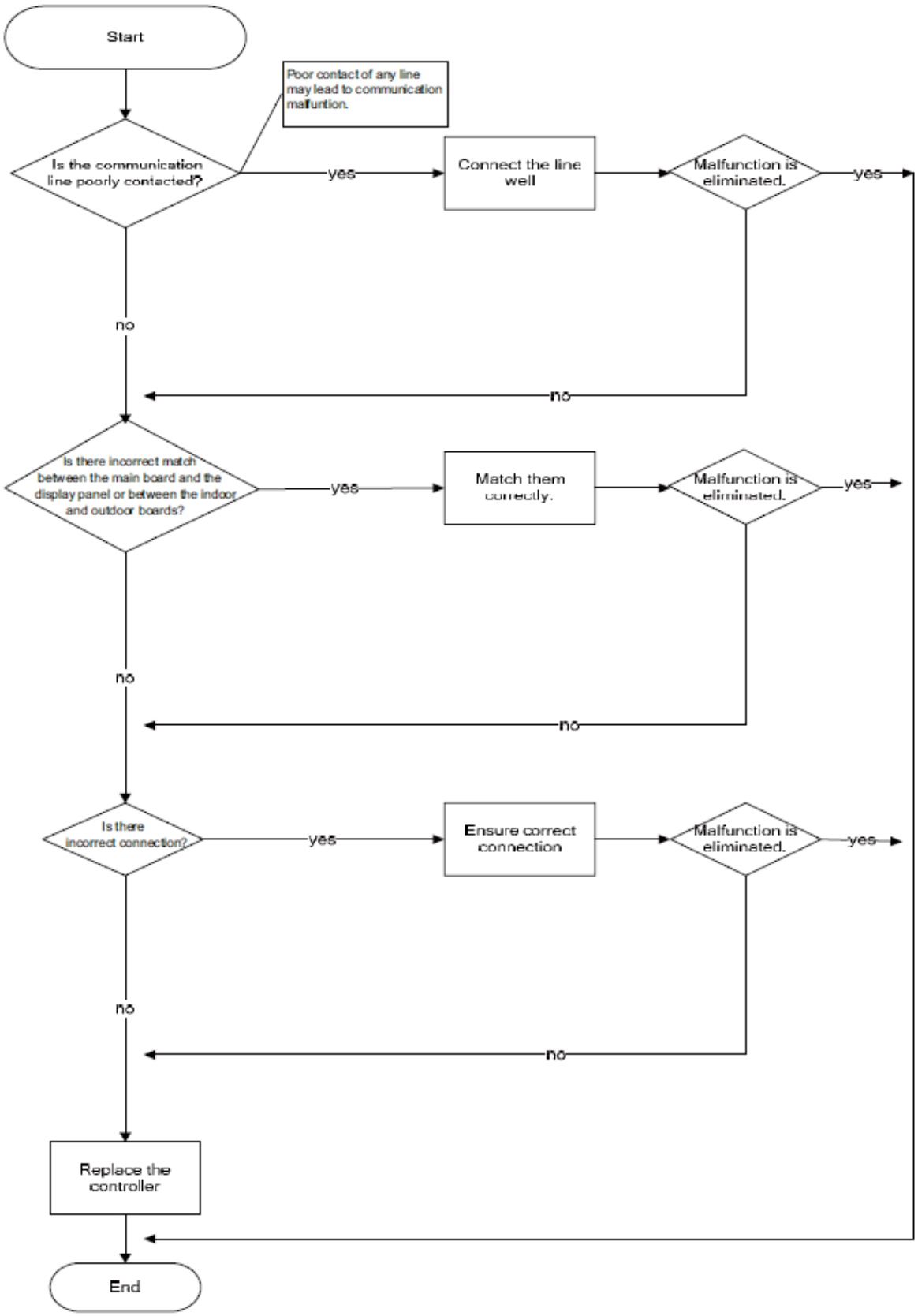
Malfunction's name	Display method of Outdoor Unit (indicator has 3 kinds of display status and they will be displayed circularly every 5 s.) □ = OFF ■ = Illuminated ☆ = Blink				A/C Status	Possible Causes
	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
Outdoor discharge temperature sensor is open/short circuited	□	□	☆	☆	During operation, the complete unit stops.	1- Outdoor temperature sensor has not been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor. 2- The head of temperature sensor has not been inserted into the copper tube.
Limit/decrease frequency due to overload	■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased.	Refer to the malfunction analysis (overload, high temperature resistant).
Decrease frequency due to overcurrent	■	■	□	■	All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload.
Decrease frequency due to high air discharge	■	■	□	□	All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV).
Voltage DC bus-bar is too high	□	■	□	☆	During operation, the complete unit stops.	1- Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265 VAC, turn on the unit after the supply voltage is increased to the normal range. 2- If the AC input is normal, measure the voltage of electrolytic capacitor C on the control panel (AP1), if it is normal, there is malfunction for the circuit, please replace the control panel (AP1).
Malfunction of complete units current detection	□	■	☆	■	During operation, the complete unit stops.	There is circuit malfunction on outdoor units control panel (AP1), please replace the outdoor unit control panel (AP1).
Overload protection for compressor	□	☆	☆	□	During operation, the complete unit stops.	1- Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1ohm. 2- Refer to the malfunction analysis (discharge protection, overload).

Malfunction's name	Display method of Outdoor Unit (indicator has 3 kinds of display status and they will be displayed circularly every 5 s.) □ = OFF ■ = Illuminated ☆ = Blink				A/C Status	Possible Causes
	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
System is abnormal	■	□	■	■	During operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
IPM protection	□	☆	□	■	During operation, the complete unit stops.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor).
PFC protection	□	■	☆	☆	During operation, the complete unit stops.	Refer to the malfunction analysis.
Desynchronizing of compressor	□	☆□	■	☆	During operation, the complete unit stops.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor).
Decrease frequency due to high temperature resistant during heating operation	■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased.	Refer to the malfunction analysis (overload, high temperature resistant).
Failure to start-up	□	☆	□	☆	During operation, the complete unit stops.	Refer to the malfunction analysis.
Malfunction of phase current detection circuit for compressor.	□	☆	■	□	During operation, the complete unit stops.	Replace outdoor control panel AP1.
EEPROM Malfunction	□	□	□	■	During operation, the complete unit stops.	Replace outdoor control panel AP1.
Charging malfunction of capacitor	□	■	□	■	During operation, the complete unit stops.	Refer to the part three-charging malfunction analysis of capacitor.
Malfunction of module temperature sensor circuit	□	□	■	☆	During operation, the complete unit stops.	Replace outdoor control panel AP1.
Module high temperature protection	■	□	☆	■	During operation, the complete unit stops.	After the complete units de-energized for 20 minutes, check whether the thermal grease on IPM Module of the outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If it is no

Malfunction's name	Display method of Outdoor Unit (indicator has 3 kinds of display status and they will be displayed circularly every 5 s.) □ = OFF ■ = Illuminated ☆ = Blink				A/C Status	Possible Causes
	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
						use, please replace control panel AP1.
Malfunction of voltage dropping for DC bus-bar	□	■	■	■	During operation, the complete unit stops.	Supply voltage is unstable.
Voltage of DC bus-bar is too low	□	■	■	□	During operation, the complete unit stops.	1- Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VACm turn on the unit after the supply voltage is increased to the normal range. 2- If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if it is normal, there is malfunction for the circuit, please replace the control panel (AP1).
Limit/decrease frequency due to high temperature of module.	■	■	■	☆	During operation, the complete unit stops.	Discharging after the complete unit is de—energized for 20 minutes, check whether the thermal grease on IPM module of outdoor control panel AP1 is sufficient and whether radiator is inserted tightly. If it is no use, please replace the control panel AP1.
The four-way valve is abnormal	■	□	☆	□	If this malfunction occurs during heating operation, the complete unit will stop operation.	1- Supply voltage is lower than AC 175V; 2- Wiring terminal 4V is loosened or broken; 3- 4V is damaged, please replace 4V.
Zero-crossing malfunction of outdoor unit	■	■	☆	□	During operation, the complete unit stops.	Replace outdoor control panel AP1.
Limit/ decrease frequency due to anti-freezing	■	■	■	□	All loads operate normally while operation frequency for compressor is decreased.	Poor air-return in indoor unit or fan speed is too low.

7.5- TROUBLESHOOTING FLOW CHART

7.5.1- Communication malfunction



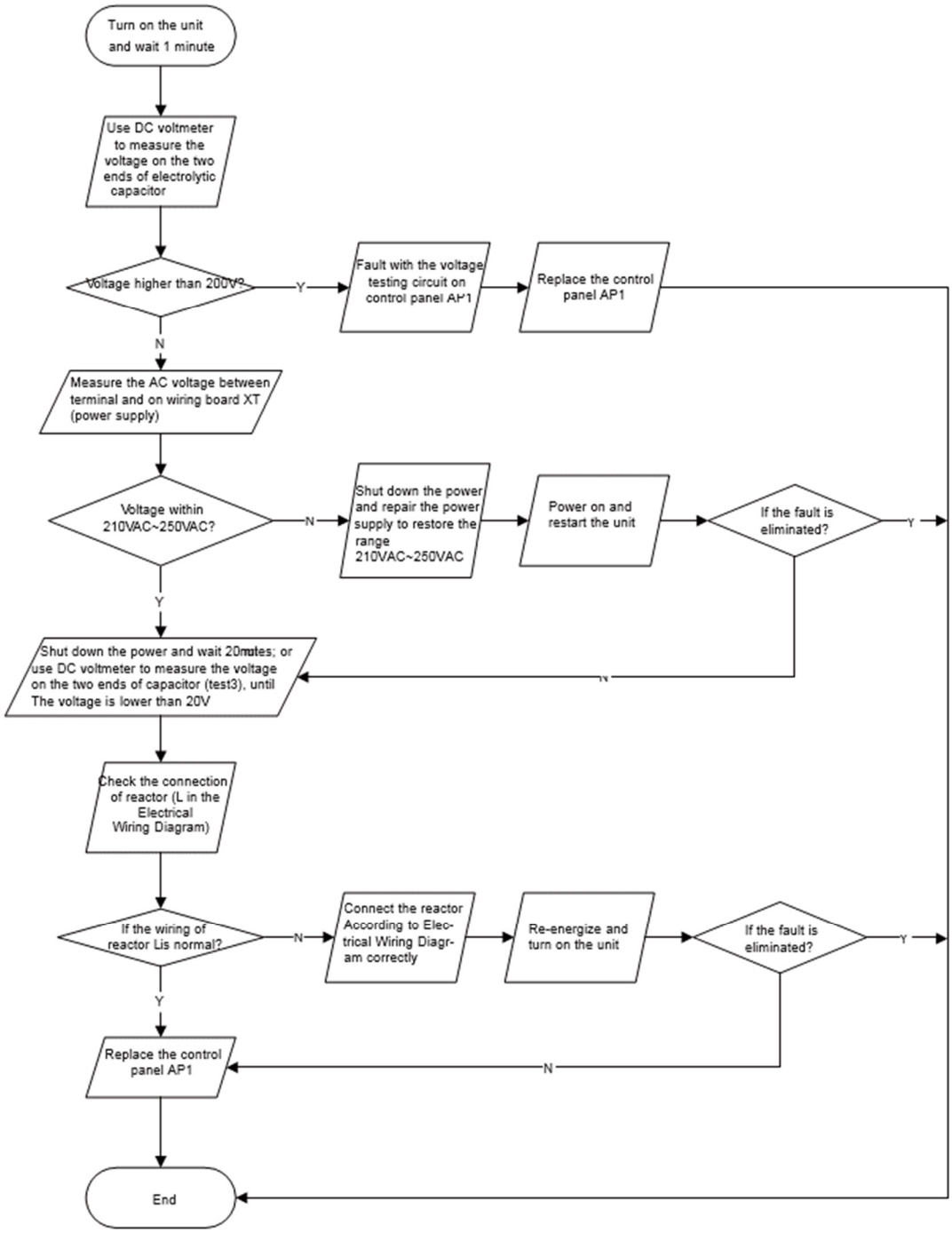
7.5.2- Capacity charging malfunction (outdoor unit malfunction)

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)

USUAL SYMPTOMS:

Check if the voltage of L and N terminal of wiring board is between 210AC-250AC using multimeter.

Is the inductor (L) well connected? Is the connection wire loosened or pull-out? Is the inductor (L) damaged?

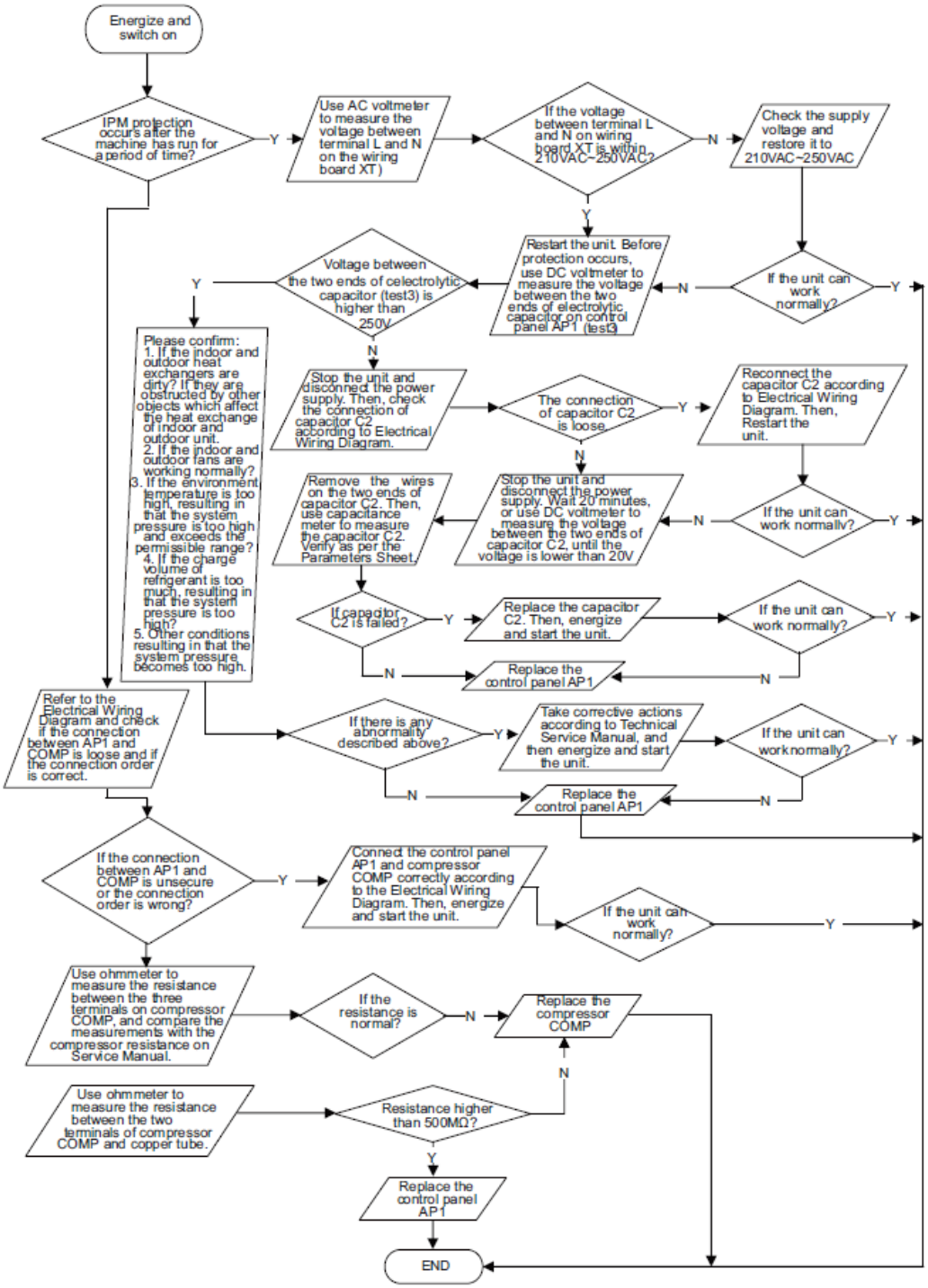


7.5.3- IPM protection desynchronizing malfunction; compressor overcurrent

USUAL SYMPTOMS

- Are the control board AP1 and the compressor COMP well connected? Are they loosened? Is the connection sequence correct?
- Is the voltage input in the normal range (test the voltage between L, N of wiring board XT by DC voltage meter)?
- Is the coil resistance of compressor normal? Is the compressor coil insulating to copper pipe correctly?
- Is the work load of unit too high? Is the heat of the unit well dissipated?
- Is the refrigerant charged appropriately?

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)

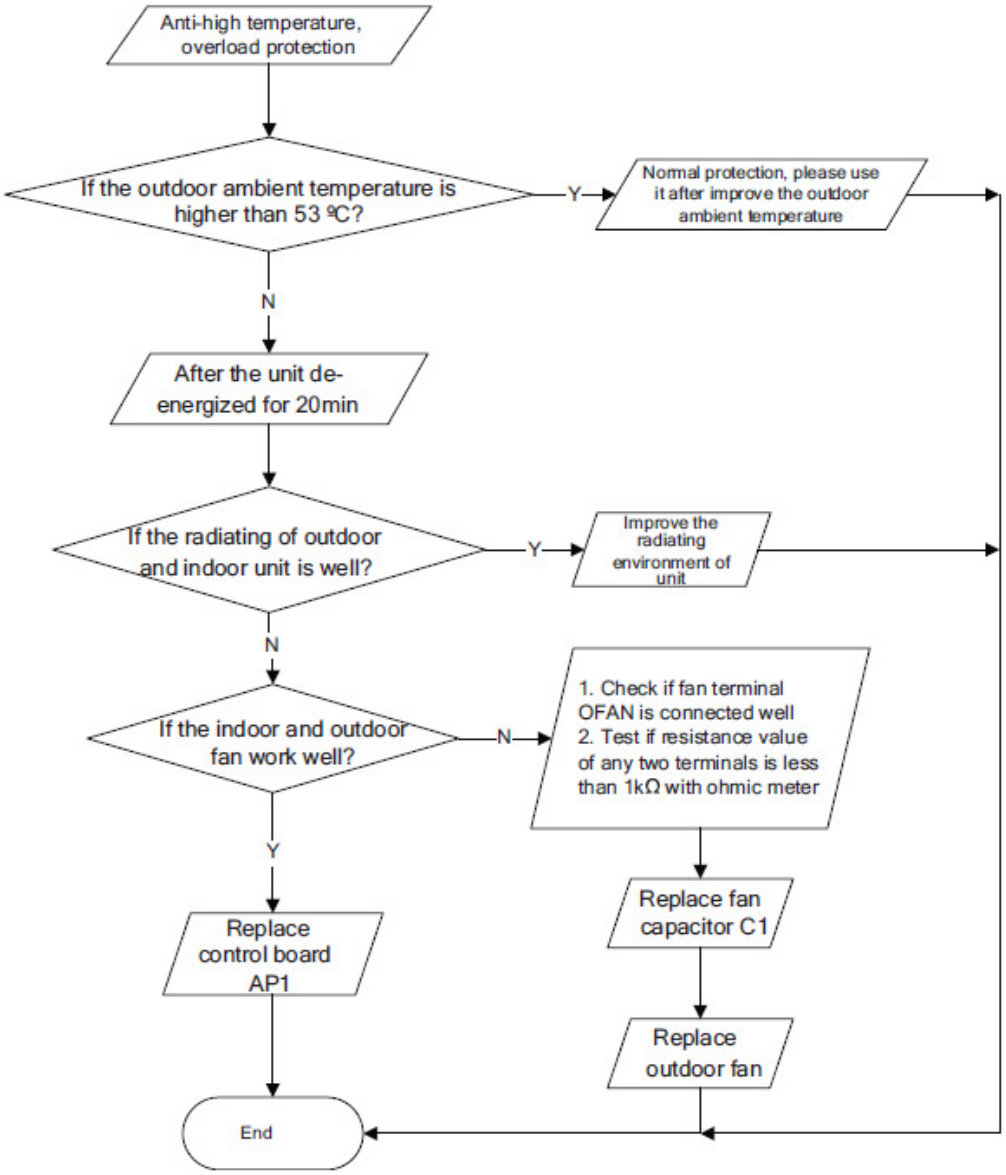


7.5.4- Anti-high temperature, overload protection

USUAL SYMPTOMS

- Is the outdoor ambient temperature in a normal range?
- Is the indoor and outdoor fans are running normal?
- How is the radiating environment of the indoor and outdoor unit?

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)

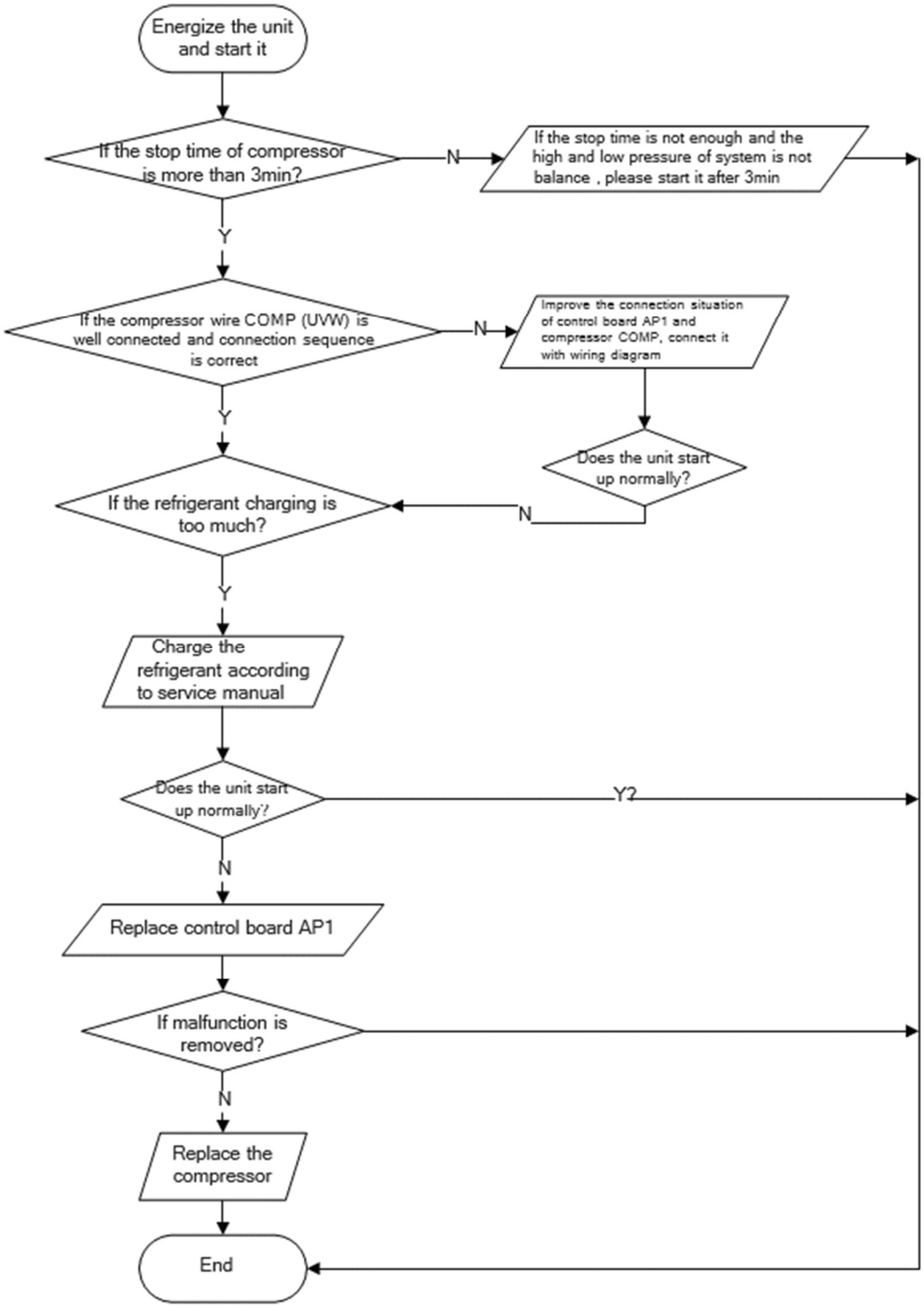


7.5.5- Failure start up malfunction

USUAL SYMPTOMS

- Is the compressor wiring correct?
- Is the stop time of the compressor enough?
- Is the compressor damaged?
- Is the refrigerant charged too much?

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)

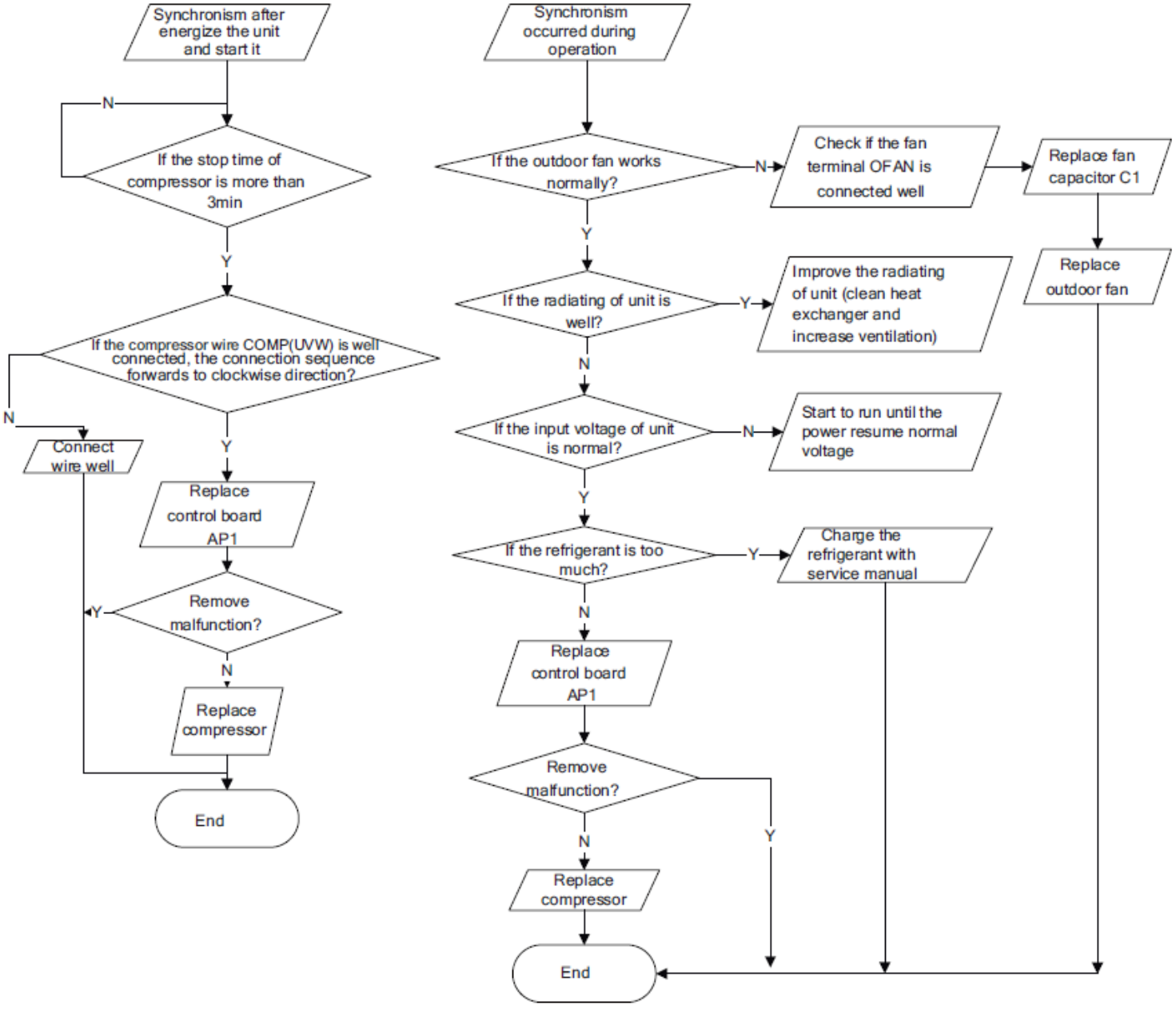


7.5.6- Compressor synchronism

USUAL SYMPTOMS:

- Is the system pressure over-high?
- Is the supply voltage under-low

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)

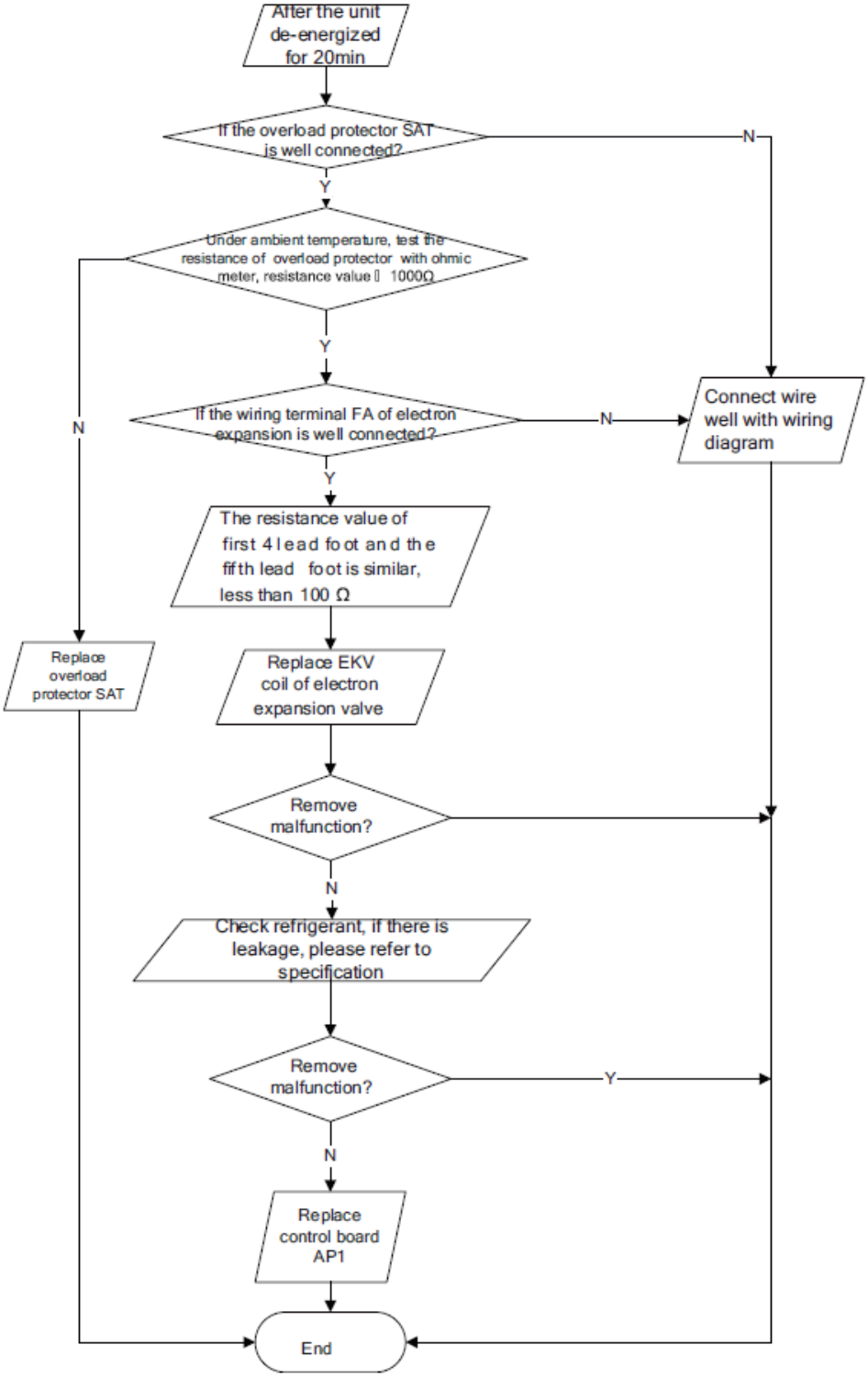


7.5.7- Overload and discharge malfunction

USUAL SYMPTOMS

- Is the electronic expansion valve connected correctly? Is the expansion valve damaged?
- Is the refrigerant leaking?
- Is the overload protector damaged?

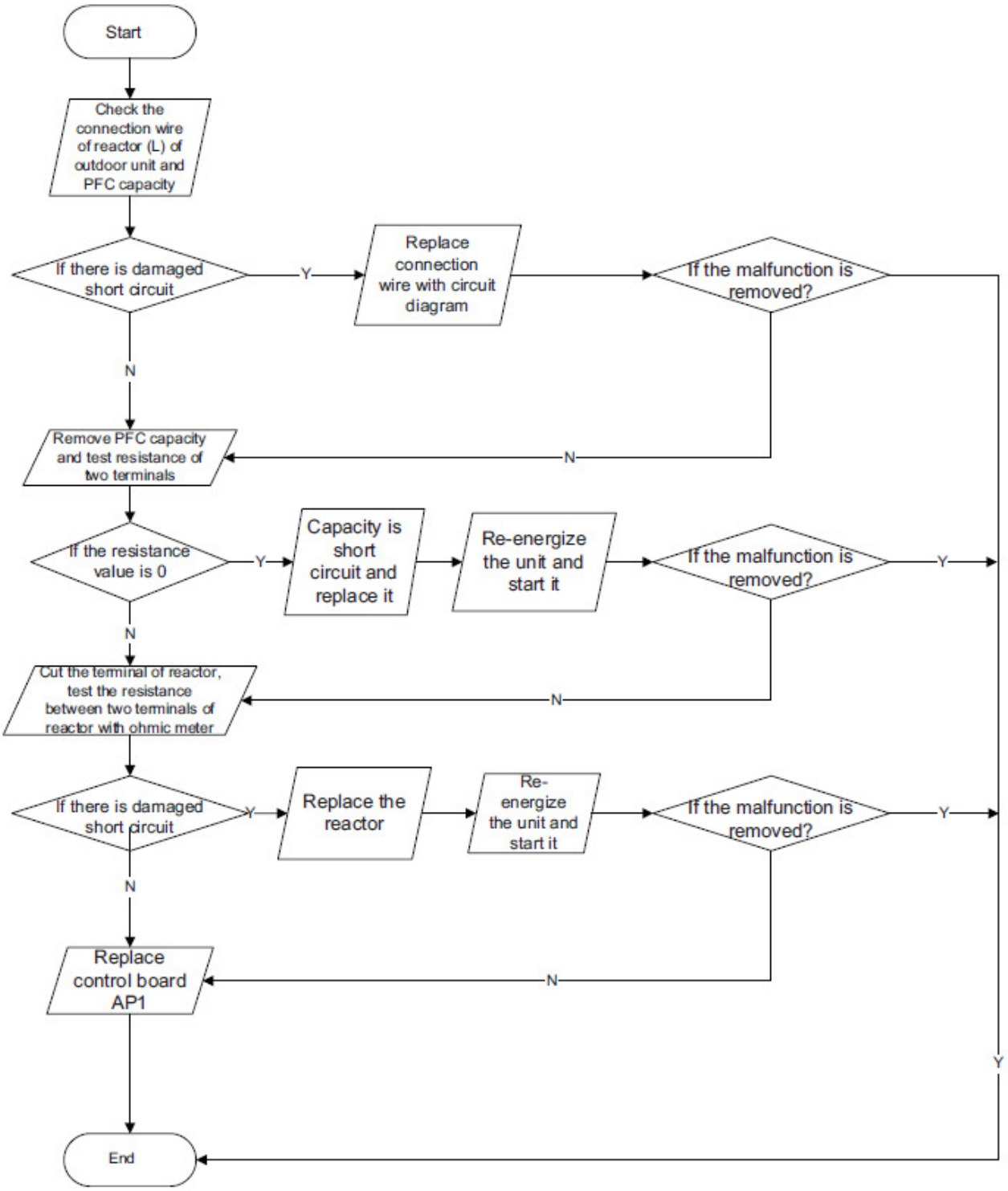
(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)



7.5.8- PFC (correction for power factor) malfunction

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)

Check if the inductor (L) of outdoor unit and PFC capacity are damaged.

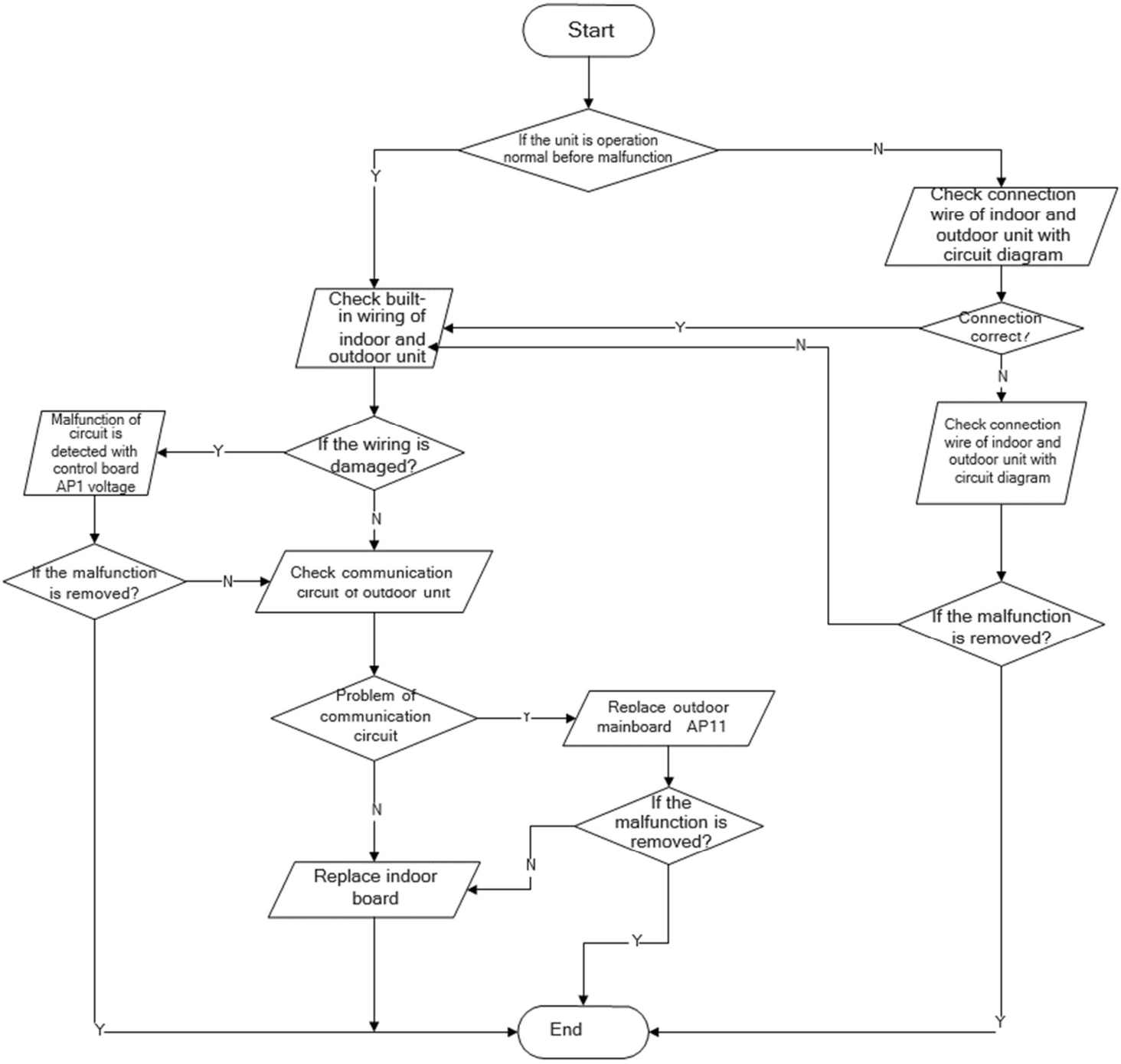


7.5.9- Communication malfunction

USUAL SYMPTOMS

- Check if the connection wire and the built-in wiring of the indoor and the outdoor are connected correctly and not damaged.
- Is the communication circuit of the indoor mainboard is damaged? Is the communication circuit of the outdoor mainboard (AP1) damaged?

(AP1 BELOW IS THE CONTROL BOARD OF OUTDOOR UNIT)



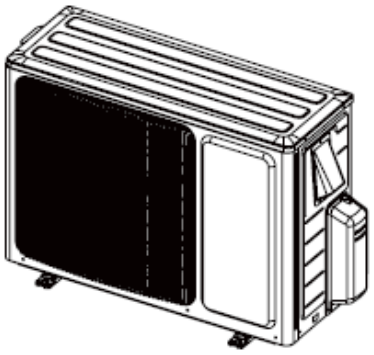
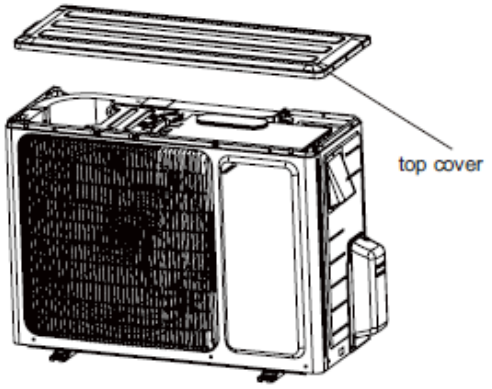
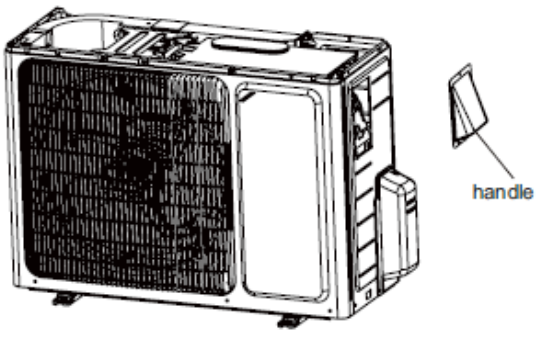
8- REMOVAL PROCEDURE OF OUTDOOR UNIT

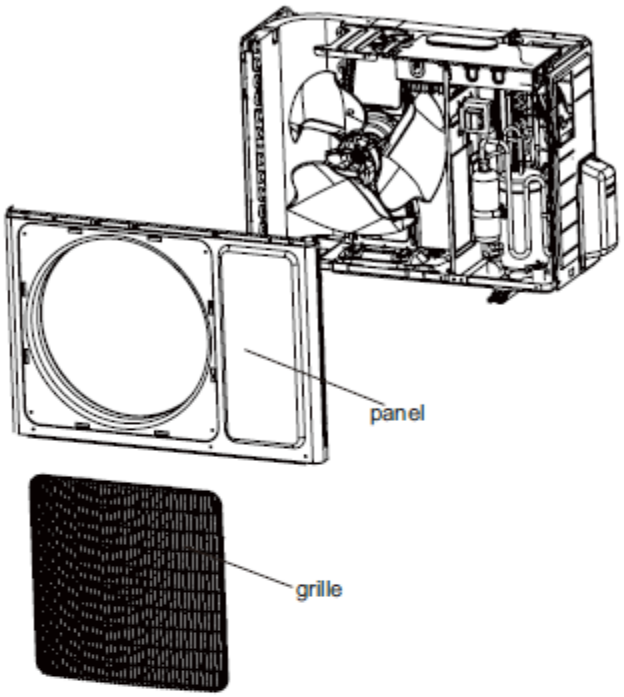
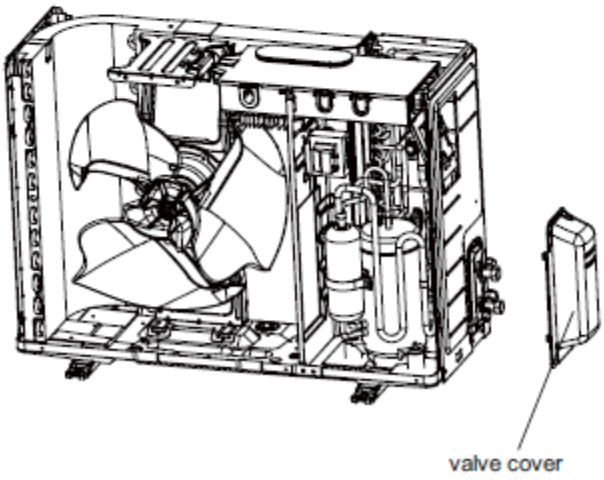
⚠ WARNING

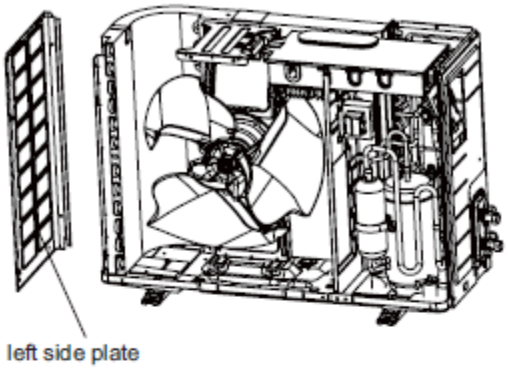
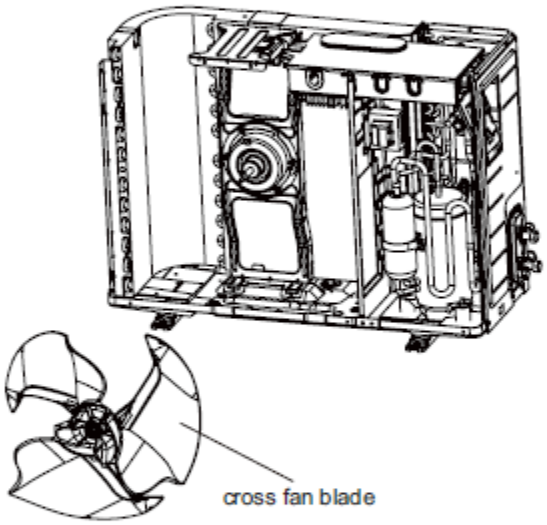
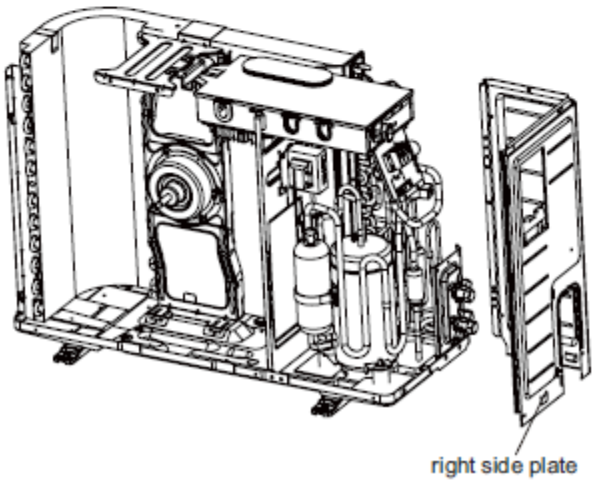
Be sure to wait for a minimum of 10 minutes after turning off all power supplier before disassembly

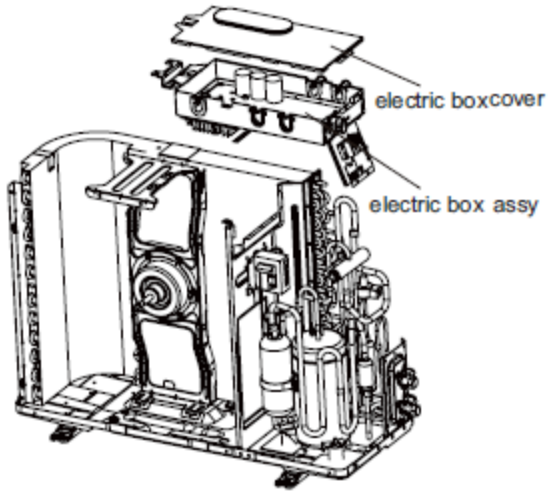
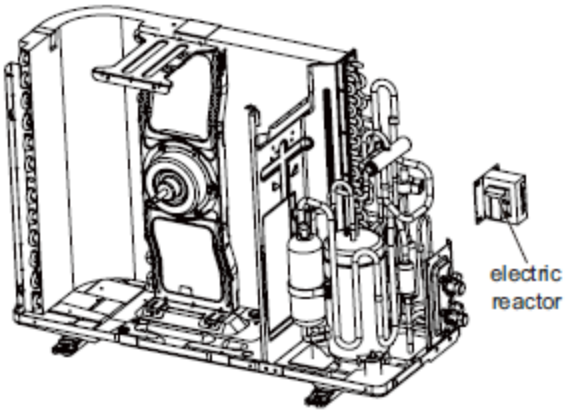
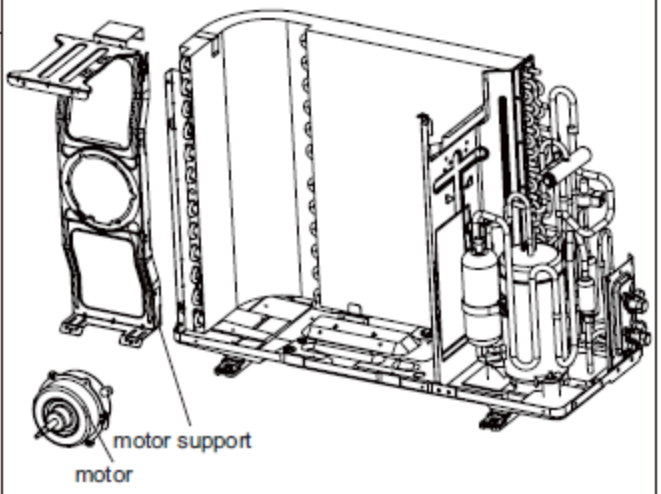
NOTE: Electric heater band is not shown below.

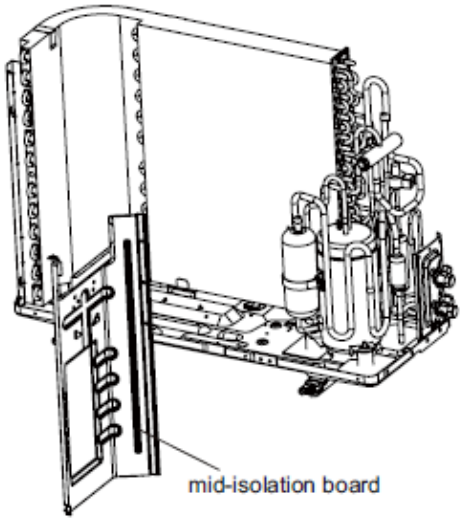
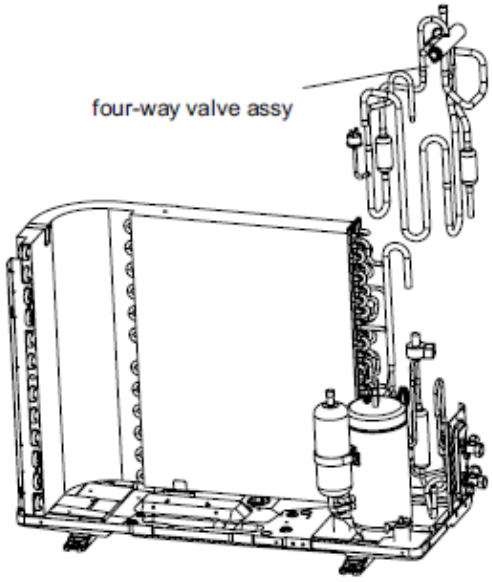
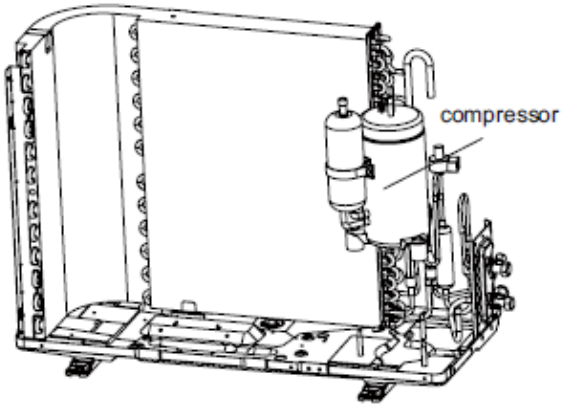
Models: COND-09-01 ET COND-12-01

Steps	Procedure	
1. Before disassembly		
2. Remove top cover	Remove the screws connecting top cover, left and right side plate, as well as panel, to remove the top cover.	
3. Remove handle	Remove the screws connecting handle and right side plate, to remove the handle.	

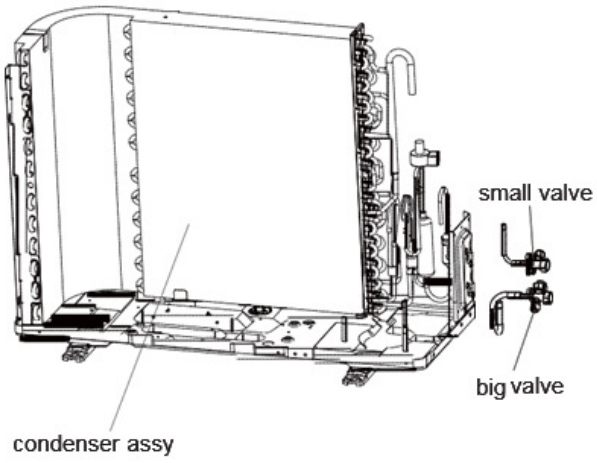
Steps	Procedure
4. Remove panel and grille	
	Remove the screws fixing panel, to remove the panel. Remove the screws connecting panel grille and panel, loosen the clamp, to remove the panel grille.
	
5. Remove valve cover	
	Remove the screw fixing valve cover, to remove the cover.
	

Steps	Procedure
6. Remove left side plate	
	Remove the screws fixing left side plate and condenser support board, to remove the left side plate.
	
7. Remove cross fan blade	
	Remove the screw nut fixing cross fan blade, remove the gasket and spring cushion, to remove the cross fan blade.
	
8. Remove right side plate	
	Remove the screws fixing right side plate and valve support, to remove the right side plate.
	

Steps	Procedure
9. Remove electric box assy	
	Remove screws fixing electric box assy and mid-isolation board, loosen the bonding tie, pull off the wiring terminal, lift to remove the electric box assy.
	
10. Remove electric reactor	
	Remove the screws fixing electric reactor, to remove the electric reactor.
	
11. Remove motor and motor support	
	Remove the four tapping screws fixing motor, pull out the contact tag of motor wiring, to remove the motor. Remove the two tapping screws fixing motor support and chassis, lift to remove the motor support.
	

Steps	Procedure
12. Remove mid-isolation board	
Remove the screws connecting mid-isolation board, chassis and condenser assy, to remove the mid-isolation.	
13. Remove four-way valve assy	
Welding cut the spot weld of four-way valve assy, compressor air suction/discharging valve and condenser pipe outlet, lift to remove the four-way valve assy. (Note: release the refrigerant before welding cutting.)	
14. Remove compressor	
Remove the three feet screw nuts fixing compressor, to remove the compressor.	

Steps	Procedure
15. Remove big and small valve assy	
	Remove screws connecting condenser assy and chassis, to remove the condenser assy. Remove the screws fixing big and small valve, to remove the valves.

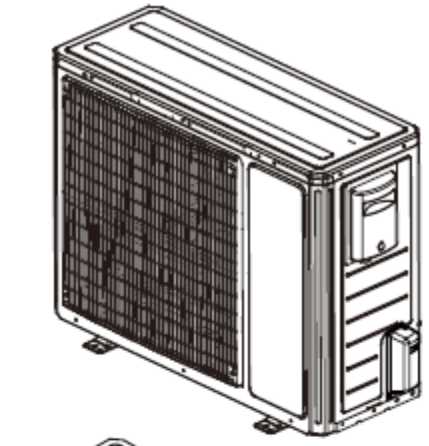


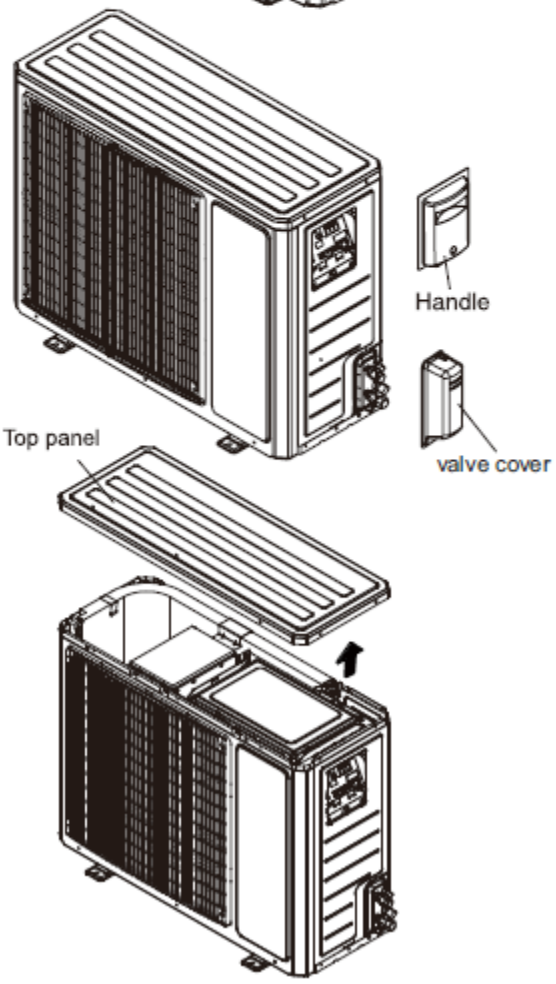
⚠ WARNING

Be sure to wait for a minimum of 10 minutes after turning off all power supplier before disassembly

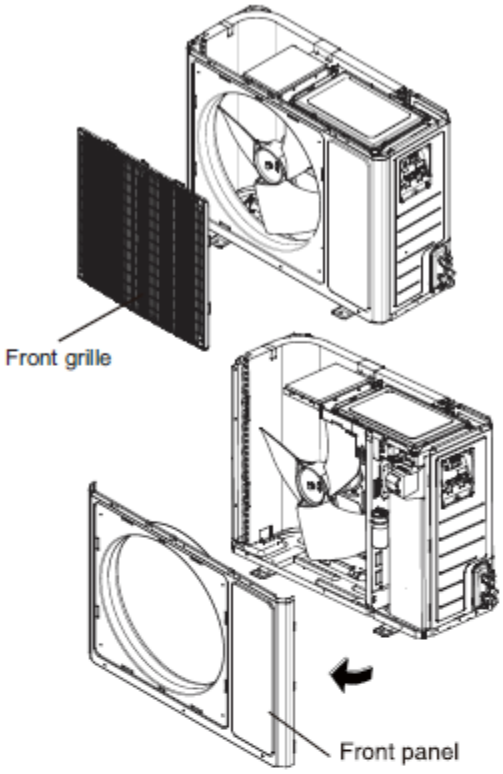
Models: COND-18-01

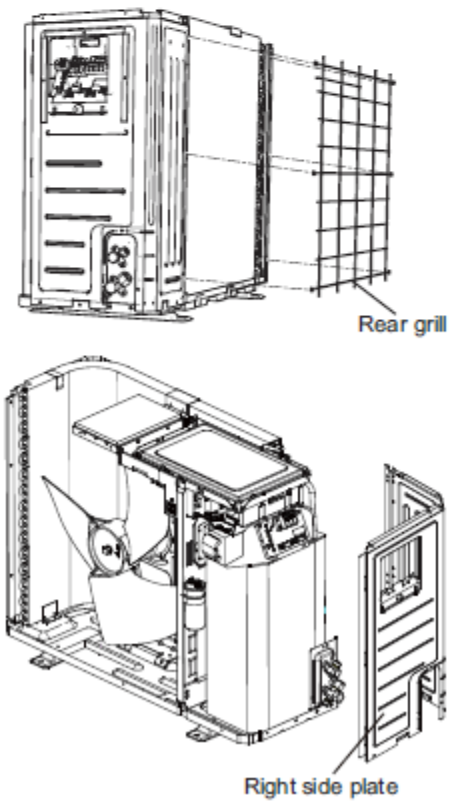
Steps	Procedure
1. Remove top cover and handle	
	Before disassembly
	Twist off the screws used for fixing the handle, pull the handle upward to remove it. Remove the screw fixing valve cover,to remove the cover.
	Twist off the screws used for fixing the top cover, pull the top cover upward to remove it.



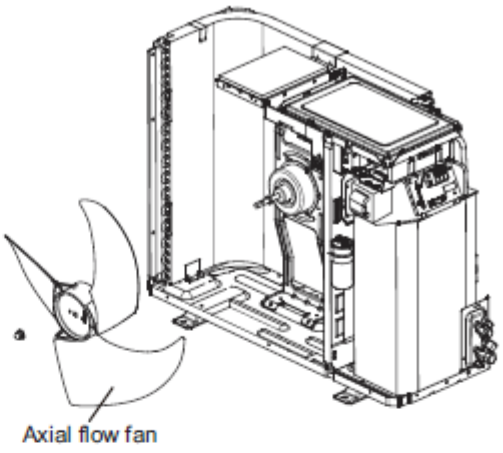


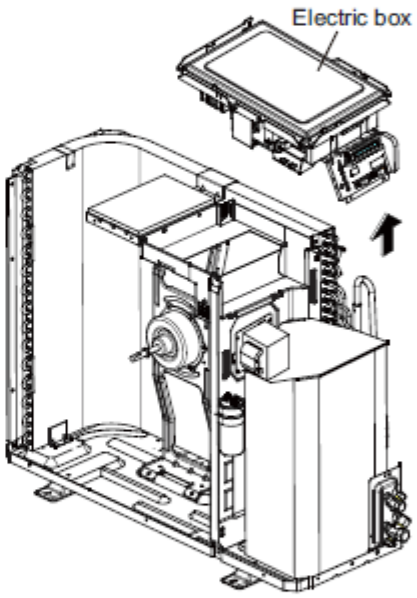
Steps	Procedure
2. Remove the front grille and the panel	
	Remove the screws connecting the front grille and the front panel. Remove the front grille. Twist off the screws fixing the panel, pull it upward, loosen the clasp on the right side, rotate it to the left and then remove the panel.
3. Remove right side plate	
	Remove screws fixing grill and then remove the grill. Twist off the screws fixing the right side plate and end plate of condenser and valve support, pull it upward and then remove the right side plate sub-assy.

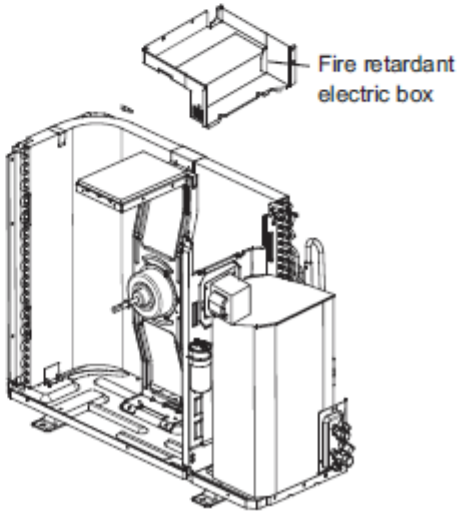


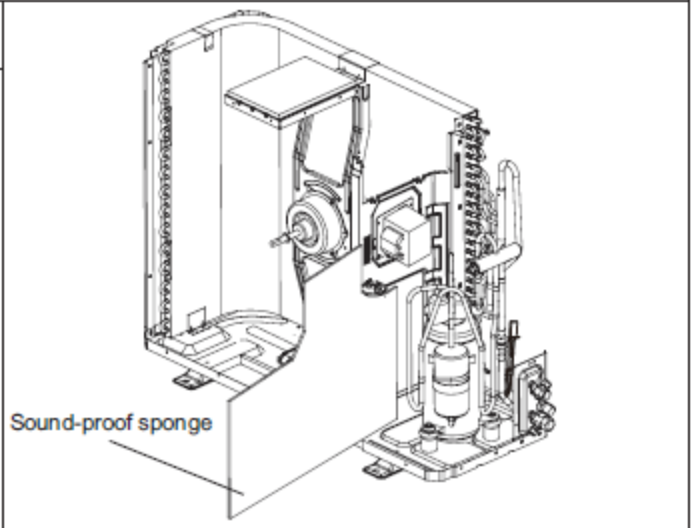
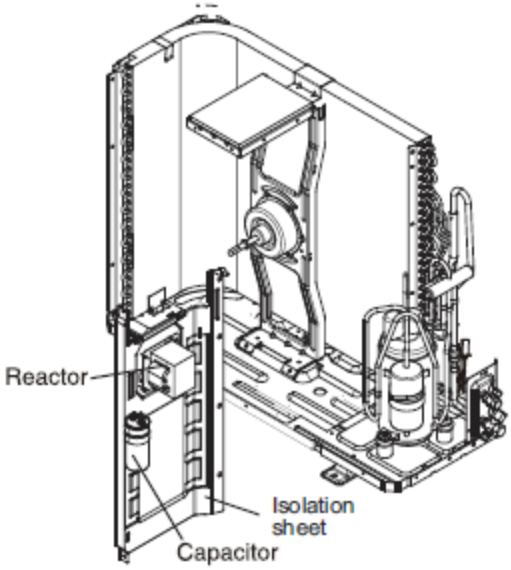
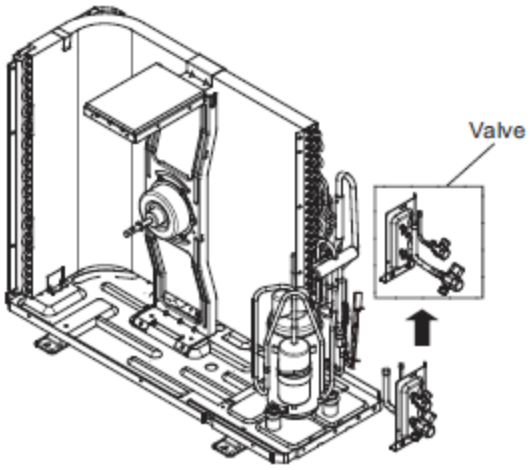


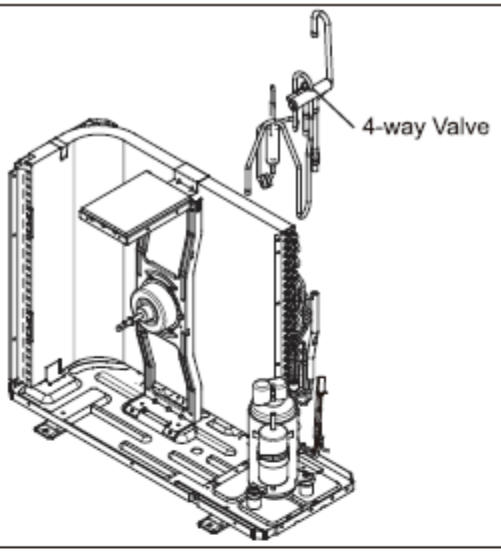
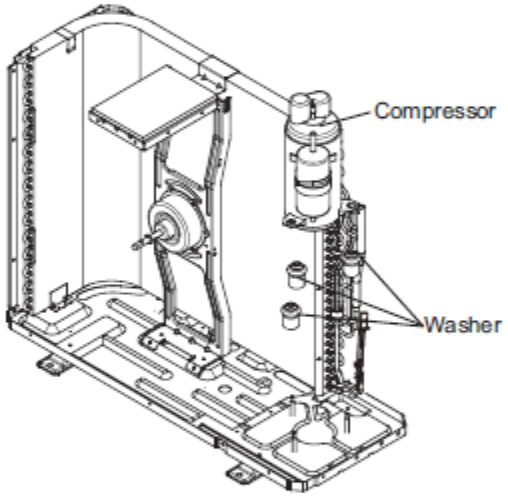
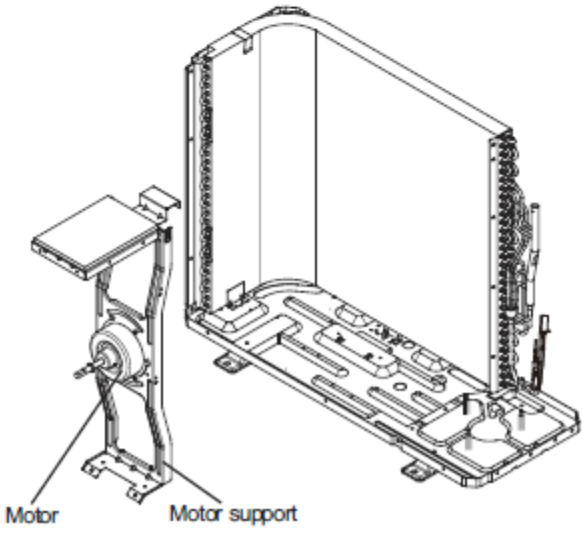
Steps	Procedure
4. Remove the axial flow fan	
	Twist off the nut fixing the blade with wrench and the draw out the axial flow fan.
5. Remove Electric Box Assy	
	Unplug wiring terminals of motor, compressor, reactor and capacitor. Remove earthing screws on side patch board. Remove screws fixing electric box and then, lift the electric box and remove it.
	Remove screws fixing fire retardant electric box and then, remove the electric box.



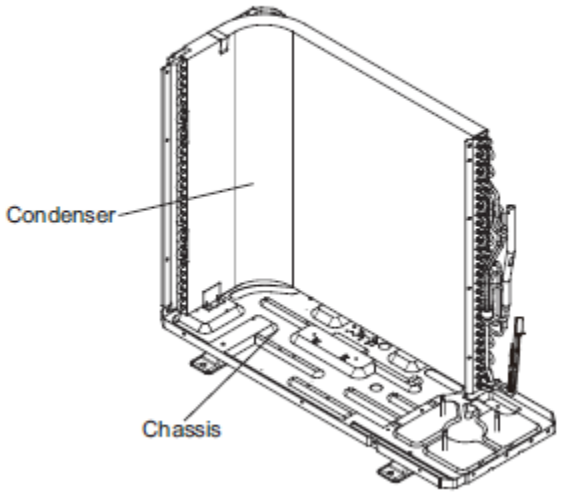




Steps	Procedure
6. Removal of sound-proof sponge	
Tear sound-proof sponge with caution.	
7. Removal of isolation sheet	
Remove screws fixing isolation sheet and then remove the sheet.	
8. Removal of valve	
Unsolder gas and liquid valves and then remove the screws fixing valve supports. Remove valves with the supports. Remove screws fixing valve and then, remove Before working, make sure that the refrigerant is empty in the circuit. Before unsoldering, wrap the valve completely with wet cloth to prevent the valve from being damaged by high temperature.	

Steps	Procedure
9. Removal of 4-way valve	
	Loosen the screw of the four way valve coil; Heat up the brazed part and withdraw the piping with pliers. Be careful so as not to burn the compressor terminals or the name plate.
	
10. Removal of compressor	
	Twist off the three foot nuts on compressor and then remove the compressor.
	
11. Removal of motor support and motor	
	Remove screws fixing motor support and then remove the support. Remove screws fixing motor and then remove the motor.
	

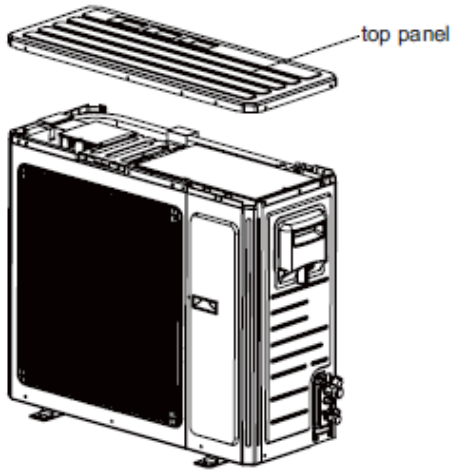
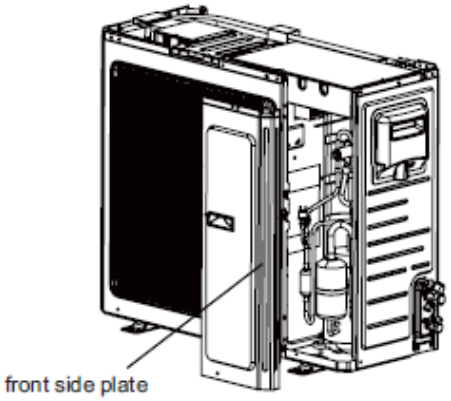
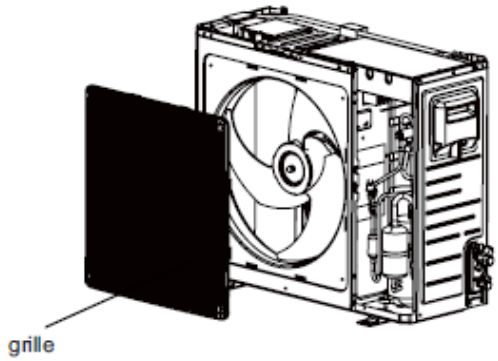
Steps	Procedure
12. Remove the condenser	
	Remove the screw connecting the condenser and the chassis. Raise the condenser to remove it.

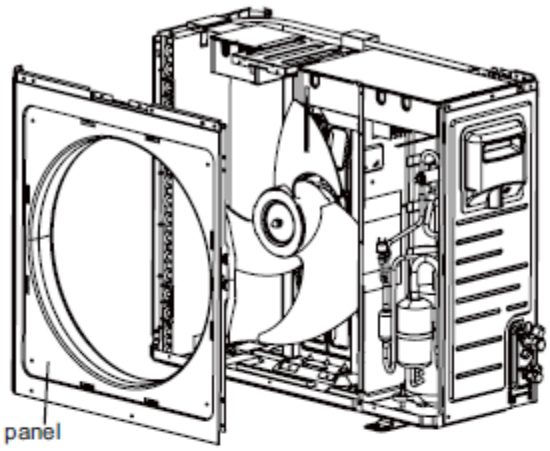
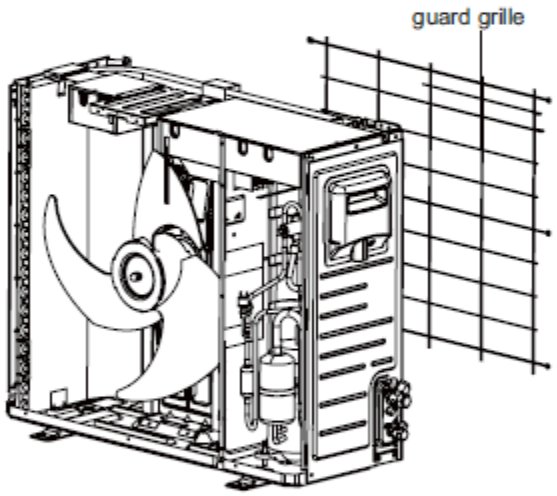
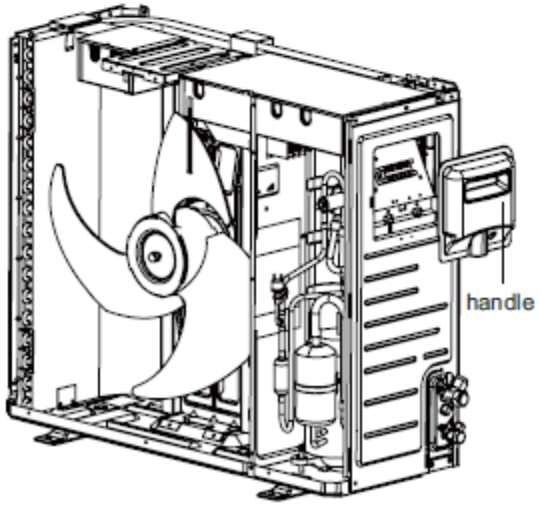


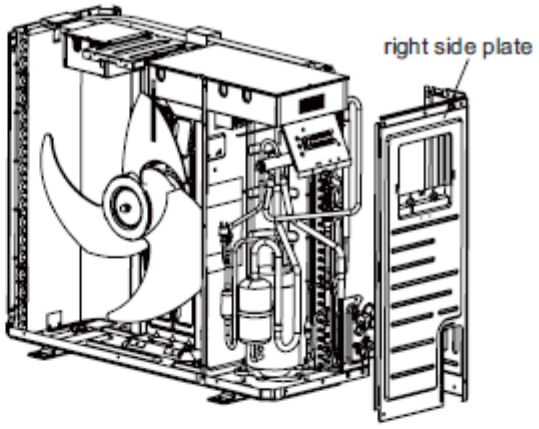
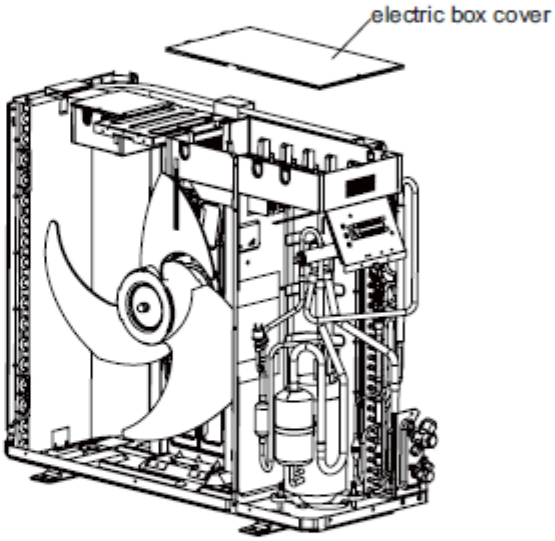
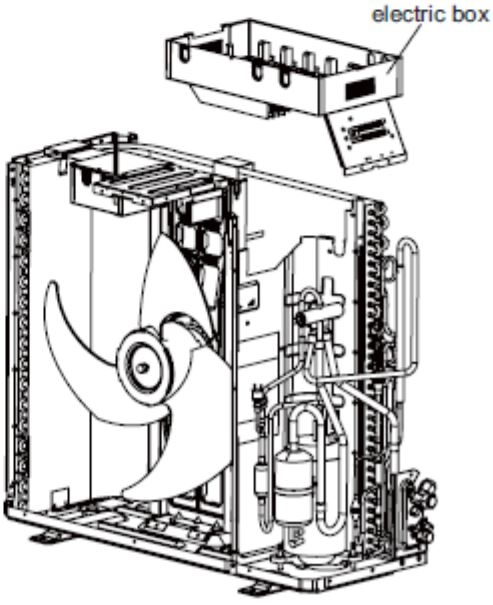
⚠ WARNING

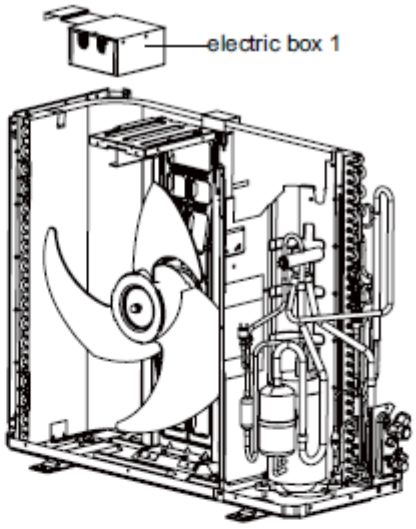
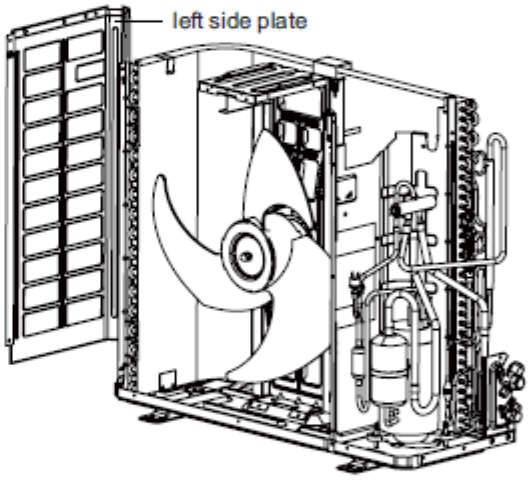
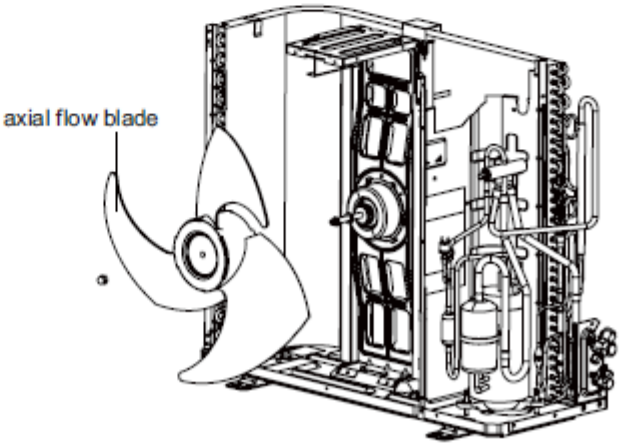
Be sure to wait for a minimum of 10 minutes after turning off all power supplier before disassembly

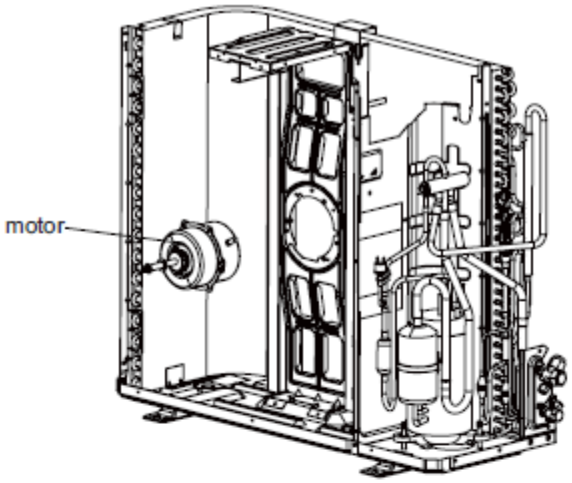
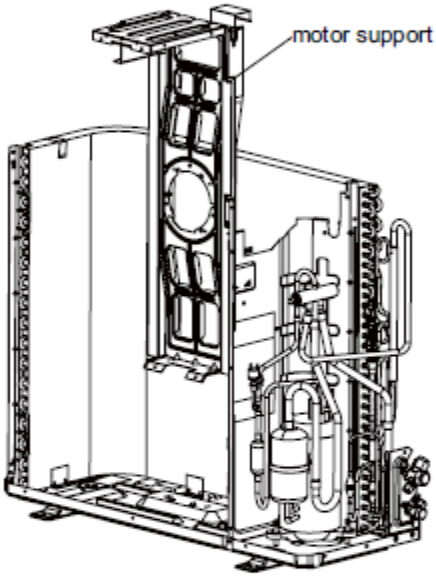
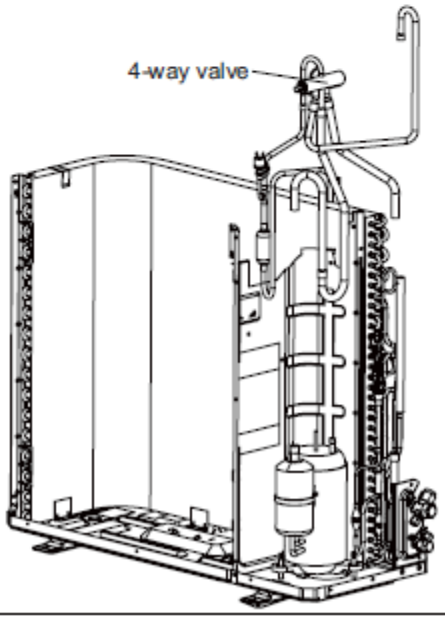
Models: COND-24-01

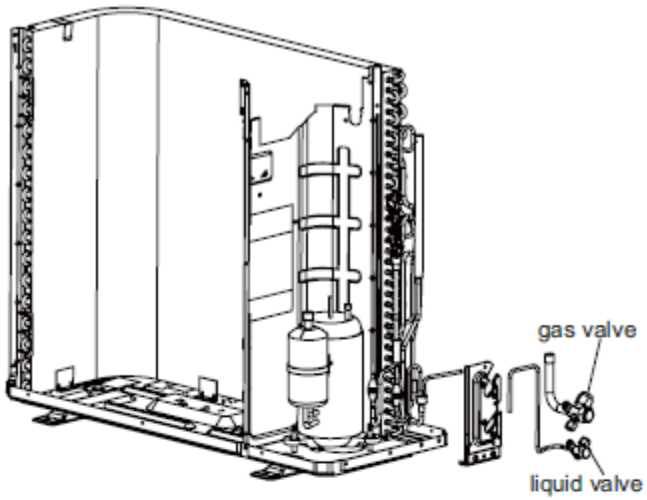
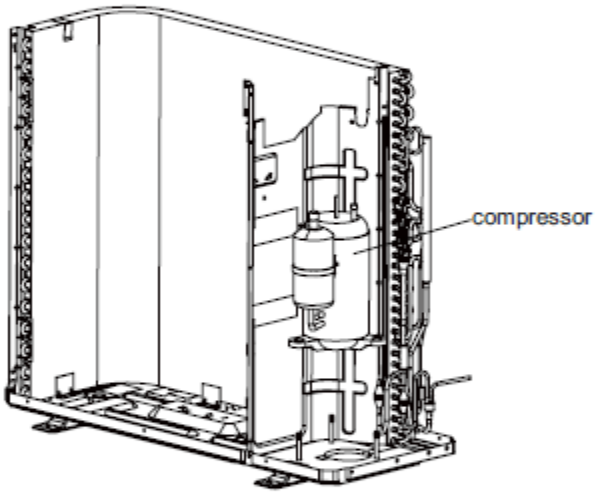
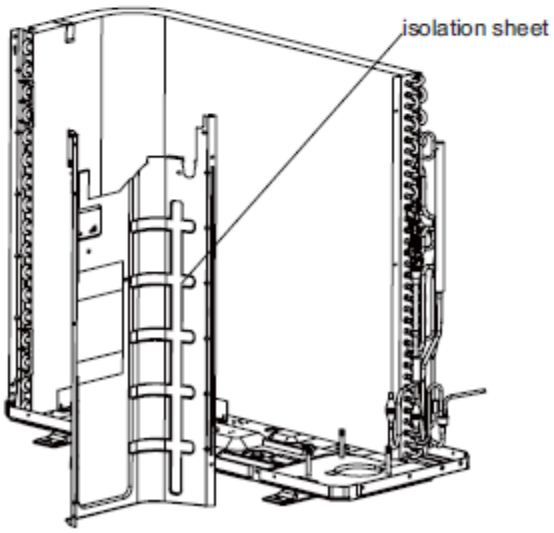
Steps		Procedure
1. Remove top cover and front side plate		
a	Use the screwdriver to remove the screws connecting the top panel and panel and side panels. Remove the top panel.	
b	Loosen the screws connecting the front side panel and mask and chassis. Remove the front side panel.	
2. Remove grille		
	Twist off the screws connecting the grille and panel, and then remove the grille.	

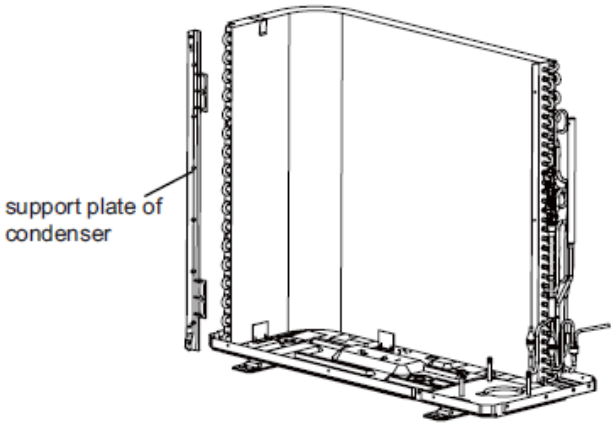
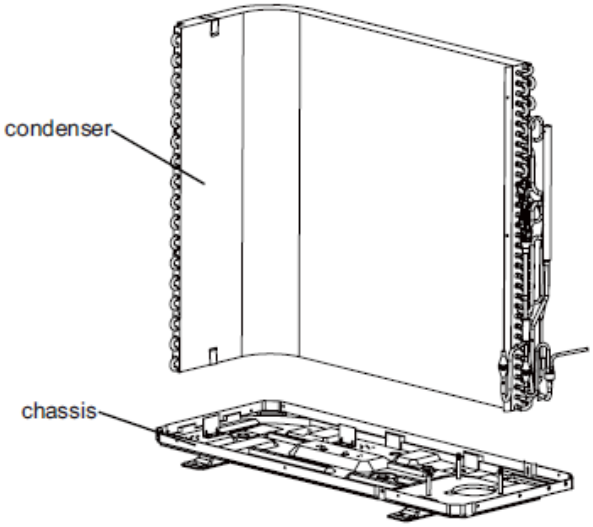
Steps	Procedurs
3. Remove panel Twist off the screws connecting the panel, chassis and motor support with screwd-river, and then remove the panel.	
4. Remove guard grille Twist off the screws fixing the guard grille and then remove the guard grille.	
5. Remove handle Twist off the screws fixing the handle and then remove the handle.	

Steps	Procedure
6. Remove right side plate	
Twist off the screws connecting the right side plate and chassis, valve support and condenser, and then remove the right side plate.	
7. Remove electric box	
a Twist off the screws on electric box cover with screwdriver, and then remove the electric box cover.	
b Twist off the screws on electric box, cut off the tieline with scissors or pliers, pull out the wiring terminal, pull it upwards to remove the electric box.	

Steps	Procedure	
c	Twist off the screws between electric box 1 and left side plate with screw-driver, pull it upwards to remove the electric box 1.	
8. Remove left side plate		
	Twist off the screws connecting the left side plate and chassis with screwdriver, and then remove the left side plate.	
9. Remove axial flow blade		
	Twist off the nuts on blade with wrench and then remove the axial flow blade.	

Steps	Procedure
10. Remove motor and motor support	
a Twist off the tapping screws fixing the motor, pull out the pin of leading wire for motor and then remove the motor.	
b Twist off the tapping screws fixing the motor support, pull it upwards and then remove the motor support.	
11. Remove 4-way valve	
Unsolder the pipeline between compressor, condenser, gas and liquid valve, and then remove the 4-way valve. (note: release all refrigerant before unsoldering).	

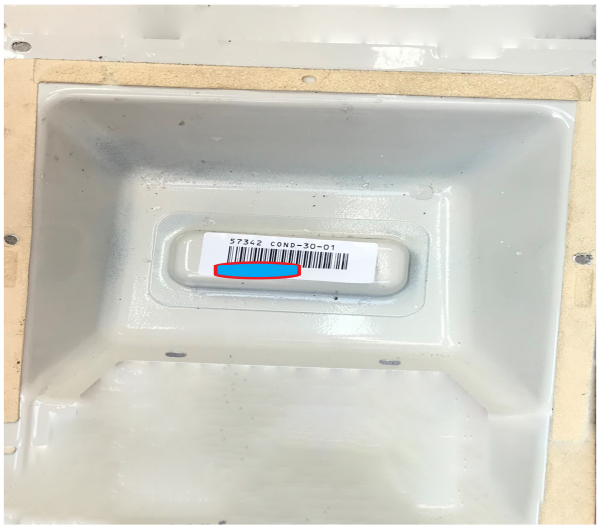
Steps	Procedure
12. Remove gas valve and liquid valve Twist off the 2 bolts fixing the valve sub-assy. Unsolder the soldering joint between gas valve and air-return pipeand then remove the gas valve.(note: when unsoldering the soldering joint, wrap the gas valve with wet cloth completely to avoid the damage to valve, and release all refrigerant completely at first). Unsolder the soldering joint between liquid valve and connection pipe of liquid valve, and then remove the liquid valve.	
13. Remove compressor Twist off the 3 foot nuts on compressor and then remove the compressor.	
14. Remove isolation sheet Twist off the screws connecting isolation sheet and end plate of condenser and chassis, and then remove the isolation sheet.	

Steps	Procedure
15. Remove support plate of condenser	
Twist off the screws connecting the support plate of condenser and condenser with screwdriver, and then remove the support plate of condenser.	
16. Remove chassis and condenser	
Pull it upwards to separate the chassis and condenser.	

9- CHECK LIST AFTER INSTALLATION

Indoor Unit :_____ sn# :_____
Outdoor Unit :_____ sn# :_____
Serial number electric box assembly : sn# :_____

Figure 31 : Location of unit serial number (bottom of handle)



☐ Filter is clean?

☐ Line length (ft) :_____ ☐ Line Heigth;_____

☐ Temperature sensor position is at mid-height of the A coil

☐ Orifice taken out? ☐ Error code :

☐ Temperature rise through out the coil :
T(ºF) before :_____
T(ºF) After :_____
Rise ΔT(ºF) :_____

☐ Static pressure : P return= _____"w.c.
P supply= _____"w.c.
ΔP= _____"w.c.

☐ Temperature readings :
T ext :_____
T discharge :_____
T condensor tube :_____
T at coil mid-height :_____

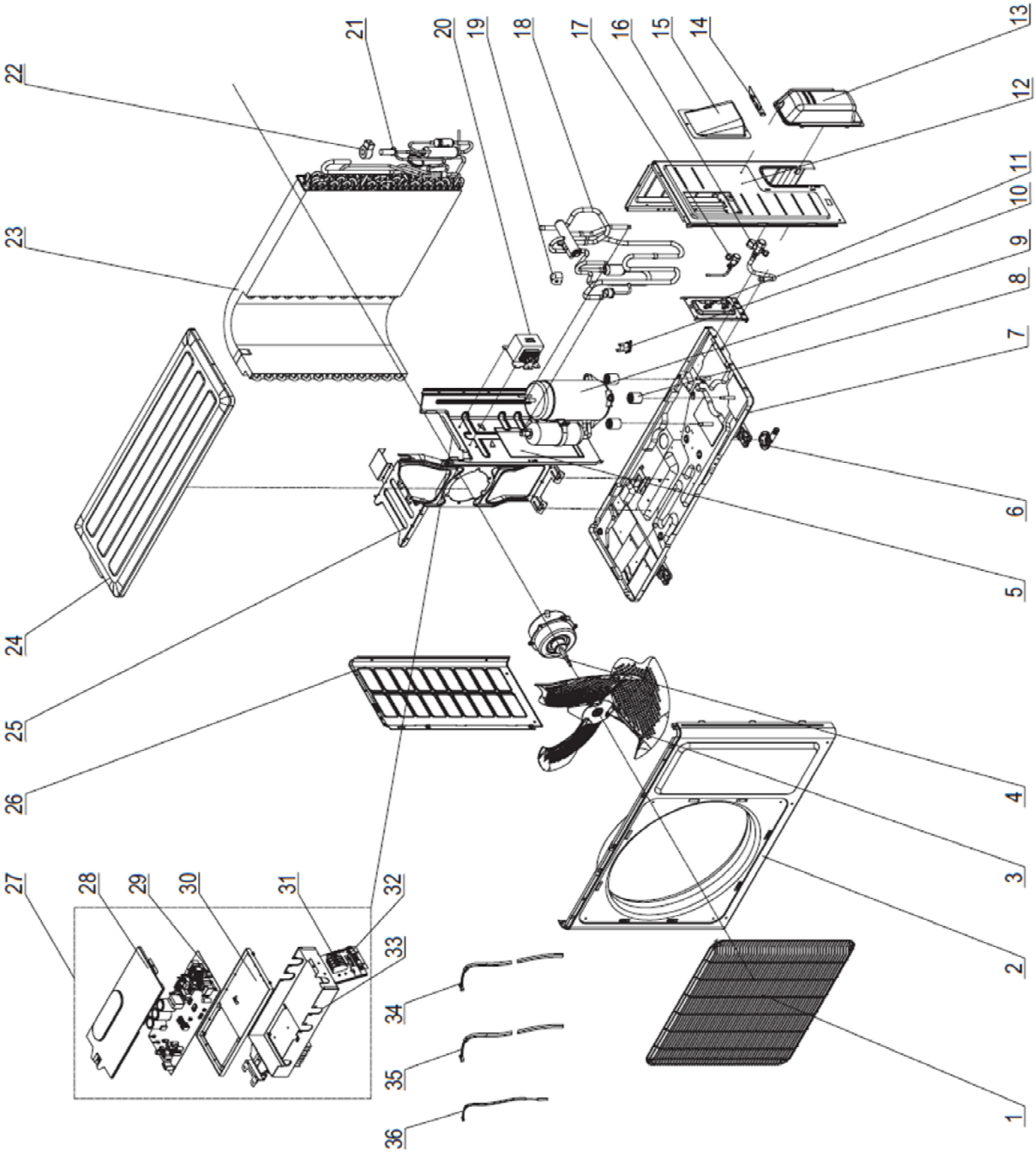
☐ In Cooling :
T mesured on succion line(Tm) :_____
Converted pressure to temperature :_____
Super heat : _____
Compressor frequency :_____Hz

☐ In heating;
Pressure read :_____
Compressor frequency :_____

☐ Notes :

10- COMPONENTS AND REPLACEMENT PARTS

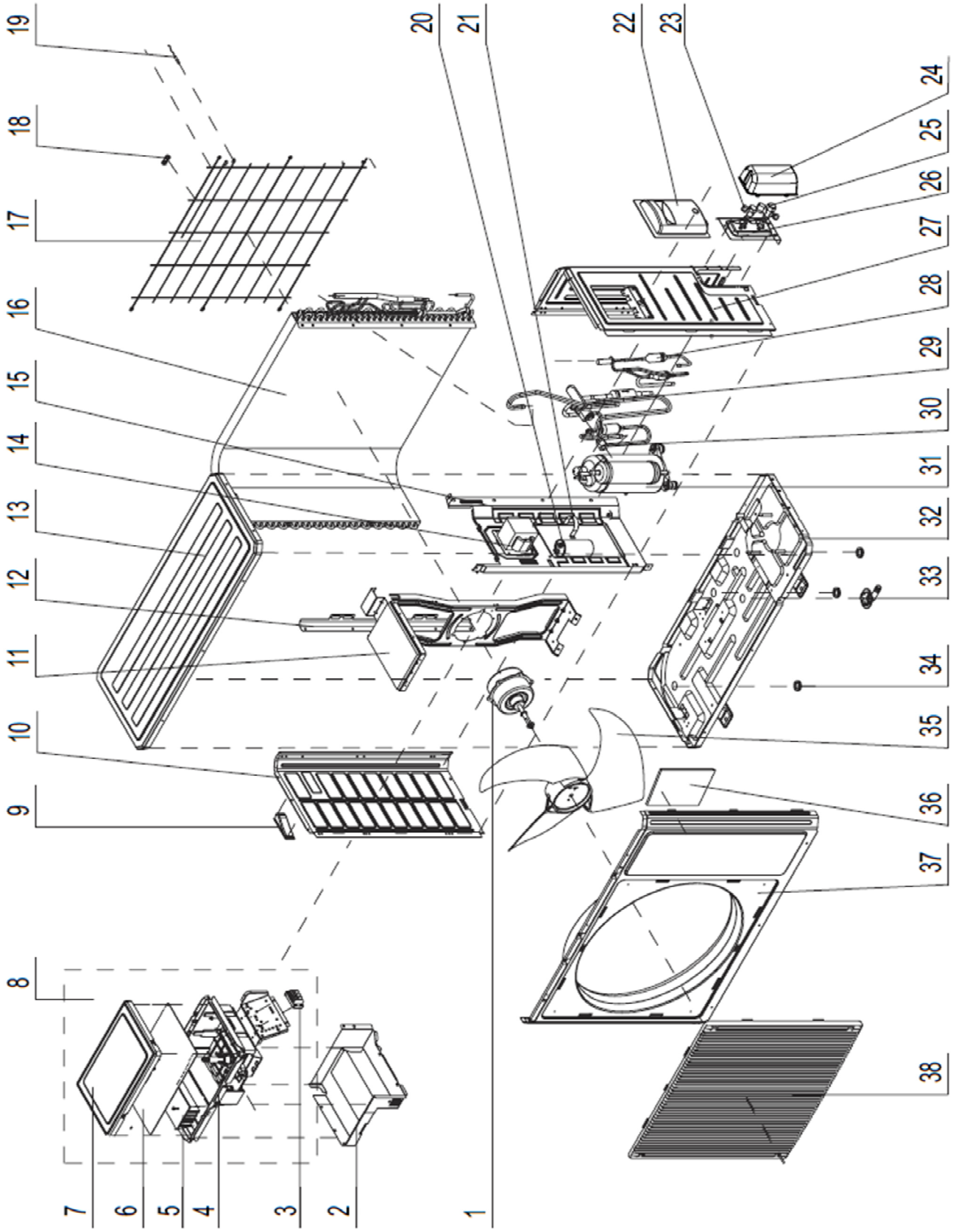
10.1- EXPLODED VUE 9/12K



10.2- PARTS LIST 9/12K

N°	Description	Part code COND-09-12	Quantity
1	Front Grill	COND-01473065	1
2	Cabinet	COND-01433034P	1
3	Axial flow fan	COND-10333417	1
4	Fan motor	COND-1501307901	1
5	Clapboard	COND-01233125	1
6	Drainage joint	COND-26113009	1
7	Chassis sub-assy	COND-02803086P	1
8	Compressor gasket	COND-76710290	3
9	Compressor and fittings	COND-00103851	1
10	Compressor overload protector (external)	COND-00183043	1
11	Valve support sub-assy	COND-01713115P	1
12	Right side plate	COND-01303244P	1
13	Valve cover	COND-22243005	1
14	Cable cross plate 1	COND-02123013P	1
15	Cable cross plate 2	COND-02123014P	1
16	Cut off valve sub-assy	COND-07133674	1
17	Cut off valve sub-assy	COND-07133204	1
18	4-way valve assy	COND-03123870	1
19	Magnet coil	COND-430004002	1
20	Inductor	COND-43130184	1
21	Electric expansion valve sub-assy	COND-07133623	1
22	Magnet coil	COND-4300876701	1
23	Condenser assy	COND-01113882	1
24	Top cover	COND-01253034P	1
25	Motor support-assy	COND-01703433	1
26	Left side plate	COND-01303169P	1
27	Electric box assy 9K	COND-02613007	1
	Electric box assy 12K	COND-02613006	1
28	Electric box cover sub-assy	COND-0260309601	1
30	Electric box 1	COND-20113005	1
31	Terminal board	COND-42010313	1
32	Wire clamp	COND-20151026	1
33	Electric box sub-assy	COND-02603616	1
34	Electrical heater (chassis)	COND-76510004	1
35	Electrical heater (compressor)	COND-76513004	1
36	Temperature sensor	COND-3900030903	1
	Interface card	K03081	1
	Communicating thermostat	R02P032	1
	Indoor Sensor Coil	R02Z012	1

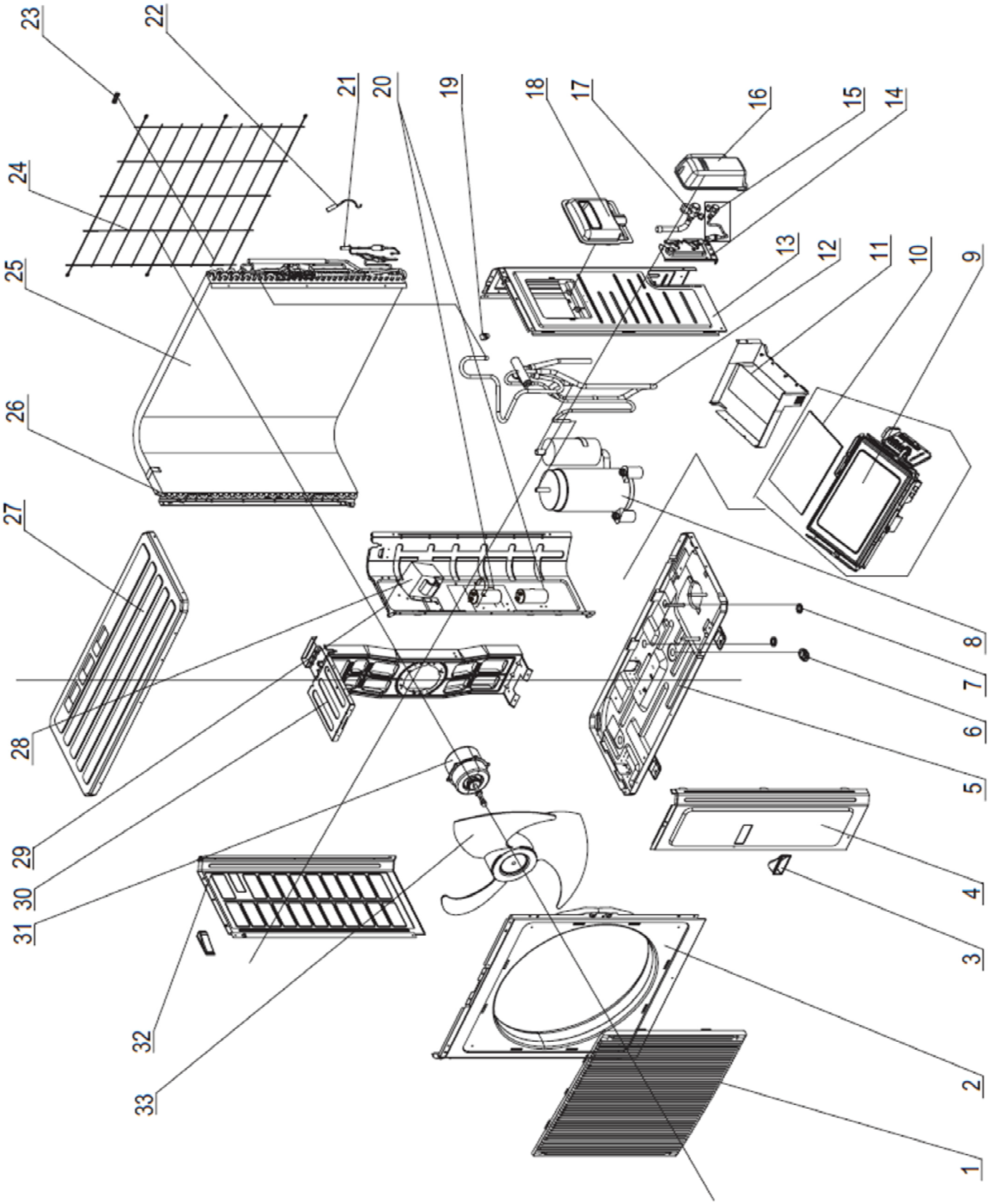
10.3- EXPLODED VUE 18K



10.4- PARTS LIST 18K

N°	Description	Part code COND-18	Quantity
1	Fan motor	COND-15015064	1
2	Electric box (fireproofing)	COND-01413148	1
3	Terminal board	COND-42010255	1
4	Electric box	COND-20113015	1
7	Electric box cover	COND-01413150	1
8	Electric box assy	COND-100001000013	1
9	Left handle	COND-26235401	1
10	Left side plate	COND-01305041P	1
11	Motor support sub-assy	COND-0170512001	1
12	Supporting board (condenser)	COND-01795021	1
13	Top cover	COND-01255005P	1
14	Inductor	COND-43130025	1
15	Clapboard sub-assy	COND-01232902	1
16	Condenser assy	COND-01163079	1
17	Rear grill	COND-01473043	1
18	Wiring clamp	COND-26115004	1
19	Temperature sensor	COND-3900030901	1
20	Capacitor CBB65	COND-33000065	1
21	Capacitor clamp-sub-assy	COND-01232902	1
22	Handle	COND-02113109	1
23	Cut off valve sub-assy	COND-07130239	1
24	Valve cover	COND-22245002	1
25	Cut off valve	COND-07133157	1
26	Valve support sub-assy	COND-01713098P	1
27	Right side plate	COND-0130509403P	1
28	Electronic expansion valve assy	COND-07133933	1
	Expansion valve Coil	COND-4300876704	
29	4-way valve assy	COND-03073213	1
30	4-way valve coil	COND-4300040045	1
31	Compressor and fittings	COND-00105246G	1
32	Chassis sub-assy	COND-01203865P	1
33	Drainage connector	COND-06123401	1
34	Drainage plug	COND-06813401	3
35	Axial flow fan	COND-10335008	1
36	Insulated board (cover of electric box)	COND-20113003	1
37	Cabinet	COND-0000030002401	1
38	Front grill	COND-01473049	1
	Interface card	K03081	1
	Communicating thermostat	R02P032	1
	Indoor Sensor Coil	R02Z012	1

10.5- EXPLODED VUE 24K



10.6- PARTS LIST 24K

N°	Description	Part code COND-24	Quantity
1	Front grill	COND-01473050	1
2	Cabinet	COND-0153501405	1
3	Handle	COND-26235401	1
4	Front side plate	COND-01303249P	1
5	Chassis sub-assy	COND-02803372P	1
6	Drainage connecter	COND-06123401	1
7	Drainage plug	COND-06813401	3
8	Compressor and fittings	COND-00105051	1
9	Electric box assy	COND-01403000103	1
			1
11	Electric box (fireproofing)	COND-01413426	1
12	4-way valve assy	COND-03015200009	1
13	Right side plate	COND-0130504402P	1
14	Valve support sub-assy	COND-017150201P	1
15	Cut off valve	COND-07130239	1
16	Valve cover	N/A	N/A
17	Cut off valve	COND-07133157	1
18	Big handle	COND-02115005	1
19	Magnet coil	COND-4300040033	1
20	Capacitor	COND-3300008107	2
21	Expansion valve coil	COND-4300876705	1
	Expansion valve	COND-07138807	1
22	Outdoor Temperature sensor	COND-3900030901	1
23	Wiring clamp	COND-26115004	1
24	Rear grill	COND-01475013	1
25	Condenser assy	COND-01103000195	1
26	Condenser support plate	COND-01175092	1
27	Top cover	COND-01255006P	1
28	Inductor	COND-43130183	1
29	Clap board assy	COND-01255016	1
30	Motor support sub-assy	COND-01705437	1
31	Fan motor	COND-1501403402	1
32	Left side plate	COND-01305043P	1
33	Axial flow fan	COND-10335014	1
	Interface card	K03081	1
	Communicating thermostat	R02P032	1
	Indoor Sensor Coil	R02Z012	1

APPENDIX 1. RESISTANCE TABLE OF AMBIENT TEMPERATURE AND INDOOR COIL SENSORS 15 K

° F	° C	Resistance kΩ	° F	°C	Resistance kΩ	° F	° C	Resistance kΩ	°F	°C	Resistance kΩ
-2	-19	138,1	68	20	18,75	138	59	3,848	208	98	1,071
0	-18	128,6	70	21	17,93	140	60	3,711	210	99	1,039
1	-17	121,6	72	22	17,14	142	61	3,579	212	100	1,009
3	-16	115	73	23	16,39	144	62	3,454	214	101	0,98
5	-15	108,7	75	24	15,68	145	63	3,333	216	102	0,952
7	-14	102,9	77	25	15	147	64	3,217	217	103	0,925
9	-13	97,4	79	26	14,36	149	65	3,105	219	104	0,898
10	-12	92,22	81	27	13,74	151	66	2,998	221	105	0,873
12	-11	87,35	82	28	13,16	153	67	2,896	223	106	0,848
14	-10	82,75	84	29	12,6	154	68	2,797	225	107	0,825
16	-9	78,43	86	30	12,07	156	69	2,702	226	108	0,802
18	-8	74,35	88	31	11,57	158	70	2,611	228	109	0,779
19	-7	70,5	90	32	11,09	160	71	2,523	230	110	0,758
21	-6	66,88	91	33	10,63	162	72	2,439	232	111	0,737
23	-5	63,46	93	34	10,2	163	73	2,358	234	112	0,717
25	-4	60,23	95	35	9,779	165	74	2,28	235	113	0,697
27	-3	57,18	97	36	9,382	167	75	2,206	237	114	0,678
28	-2	54,31	99	37	9,003	169	76	2,133	239	115	0,66
30	-1	51,59	100	38	8,642	171	77	2,064	241	116	0,642
32	0	49,02	102	39	8,297	172	78	1,997	243	117	0,625
34	1	46,6	104	40	7,967	174	79	1,933	244	118	0,608
36	2	44,31	106	41	7,653	176	80	1,871	246	119	0,592
37	3	42,14	108	42	7,352	178	81	1,811	248	120	0,577
39	4	40,09	109	43	7,065	180	82	1,754	250	121	0,561
41	5	38,15	111	44	6,791	181	83	1,699	252	122	0,547
43	6	36,32	113	45	6,529	183	84	1,645	253	123	0,532
45	7	34,58	115	46	6,278	185	85	1,594	255	124	0,519
46	8	32,94	117	47	6,038	187	86	1,544	257	125	0,505
48	9	31,38	118	48	5,809	189	87	1,497	259	126	0,492
50	10	29,9	120	49	5,589	190	88	1,451	261	127	0,48
52	11	28,51	122	50	5,379	192	89	1,408	262	128	0,467
54	12	27,18	124	51	5,197	194	90	1,363	264	129	0,456
55	13	25,92	126	52	4,986	196	91	1,322	266	130	0,444
57	14	24,73	127	53	4,802	198	92	1,282	268	131	0,433
59	15	23,6	129	54	4,625	199	93	1,244	270	132	0,422
61	16	22,53	131	55	4,456	201	94	1,207	271	133	0,412
63	17	21,51	133	56	4294	203	95	1,171	273	134	0,401
64	18	20,54	135	57	4,139	205	96	1,136	275	135	0,391
66	19	19,63	136	58	3,99	207	97	1,103	277	136	0,382

APPENDIX 2. RESISTANCE TABLE OF TUBE TEMPERATURE SENSOR 20 K

° F	° C	Resistance kΩ	° F	°C	Resistance kΩ	° F	° C	Resistance kΩ	°F	°C	Resistance kΩ
-2	-19	181,4	68	20	25,01	138	59	5,13	208	98	1,427
0	-18	171,4	70	21	23,9	140	60	4,948	210	99	1,386
1	-17	162,1	72	22	22,85	142	61	4,773	212	100	1,346
3	-16	153,3	73	23	21,85	144	62	4,605	214	101	1,307
5	-15	145	75	24	20,9	145	63	4,443	216	102	1,269
7	-14	137,2	77	25	20	147	64	4,289	217	103	1,233
9	-13	129,9	79	26	19,14	149	65	4,14	219	104	1,198
10	-12	123	81	27	18,13	151	66	3,998	221	105	1,164
12	-11	116,5	82	28	17,55	153	67	3,861	223	106	1,131
14	-10	110,3	84	29	16,8	154	68	3,729	225	107	1,099
16	-9	104,6	86	30	16,1	156	69	3,603	226	108	1,069
18	-8	99,13	88	31	15,43	158	70	3,481	228	109	1,039
19	-7	94	90	32	14,79	160	71	3,364	230	110	1,01
21	-6	89,17	91	33	14,18	162	72	3,252	232	111	0,983
23	-5	84,61	93	34	13,59	163	73	3,144	234	112	0,956
25	-4	80,31	95	35	13,04	165	74	3,04	235	113	0,93
27	-3	76,24	97	36	12,51	167	75	2,94	237	114	0,904
28	-2	72,41	99	37	12	169	76	2,844	239	115	0,88
30	-1	68,79	100	38	11,52	171	77	2,752	241	116	0,856
32	0	65,37	102	39	11,06	172	78	2,663	243	117	0,833
34	1	62,13	104	40	10,62	174	79	2,577	244	118	0,811
36	2	59,08	106	41	10,2	176	80	2,495	246	119	0,77
37	3	56,19	108	42	9,803	178	81	2,415	248	120	0,769
39	4	53,46	109	43	9,42	180	82	2,339	250	121	0,746
41	5	50,87	111	44	9,054	181	83	2,265	252	122	0,729
43	6	48,42	113	45	8,705	183	84	2,194	253	123	0,71
45	7	46,11	115	46	8,37	185	85	2,125	255	124	0,692
46	8	43,92	117	47	8,051	187	86	2,059	257	125	0,674
48	9	41,84	118	48	7,745	189	87	1,996	259	126	0,658
50	10	39,87	120	49	7,453	190	88	1,934	261	127	0,64
52	11	38,01	122	50	7,173	192	89	1,875	262	128	0,623
54	12	36,24	124	51	6,905	194	90	1,818	264	129	0,607
55	13	34,57	126	52	6,648	196	91	1,736	266	130	0,592
57	14	32,98	127	53	6,403	198	92	1,71	268	131	0,577
59	15	31,47	129	54	6,167	199	93	1,658	270	132	0,563
61	16	30,04	131	55	5,942	201	94	1,609	271	133	0,549
63	17	26,68	133	56	5,726	203	95	1,561	273	134	0,535
64	18	27,39	135	57	5,519	205	96	1,515	275	135	0,521
66	19	26,17	136	58	5,32	207	97	1,47	277	136	0,509

APPENDIX 3. RESISTANCE TABLE OF OUTDOOR DISCHARGE TEMPERATURE SENSOR 50 K

° F	° C	Resistance kΩ	° F	°C	Resistance kΩ	° F	° C	Resistance kΩ	°F	°C	Resistance kΩ
-20	-29	853,5	50	10	98	120	49	18,34	190	88	4,754
-18	-28	799,8	52	11	93,42	122	50	17,65	192	89	4,609
-17	-27	750	54	12	89,07	124	51	16,99	194	90	4,469
-15	-26	703,8	55	13	84,95	126	52	16,36	196	91	4,334
-13	-25	660,8	57	14	81,05	127	53	15,75	198	92	4,204
-11	-24	620,8	59	15	77,35	129	54	15,17	199	93	4,079
-9	-23	580,6	61	16	73,83	131	55	14,62	201	94	3,958
-8	-22	548,9	63	17	70,5	133	56	14,09	203	95	3,841
-6	-21	516,6	64	18	67,34	135	57	13,58	205	96	3,728
-4	-20	486,5	66	19	64,33	136	58	13,09	207	97	3,619
-2	-19	458,3	68	20	61,48	138	59	12,62	208	98	3,514
0	-18	432	70	21	58,77	140	60	12,17	210	99	3,413
1	-17	407,4	72	22	56,19	142	61	11,74	212	100	3,315
3	-16	384,5	73	23	53,74	144	62	11,32	214	101	3,22
5	-15	362,9	75	24	51,41	145	63	10,93	216	102	3,129
7	-14	342,8	77	25	49,19	147	64	10,54	217	103	3,04
9	-13	323,9	79	26	47,08	149	65	10,18	219	104	2,955
10	-12	306,2	81	27	45,07	151	66	9,827	221	105	2,872
12	-11	289,6	82	28	43,16	153	67	9,489	223	106	2,792
14	-10	274	84	29	41,34	154	68	9,165	225	107	2,715
16	-9	259,3	86	30	39,61	156	69	8,854	226	108	2,64
18	-8	245,6	88	31	37,96	158	70	8,555	228	109	2,568
19	-7	232,6	90	32	36,38	160	71	8,268	230	110	2,498
21	-6	220,5	91	33	34,88	162	72	7,991	232	111	2,431
23	-5	209	93	34	33,45	163	73	7,726	234	112	2,365
25	-4	198,3	95	35	32,09	165	74	7,47	235	113	2,302
27	-3	199,1	97	36	30,79	167	75	7,224	237	114	2,241
28	-2	178,5	99	37	29,54	169	76	6,998	239	115	2,182
30	-1	169,5	100	38	28,36	171	77	6,761	241	116	2,124
32	0	161	102	39	27,23	172	78	6,542	243	117	2,069
34	1	153	104	40	26,15	174	79	6,331	244	118	2,015
36	2	145,4	106	41	25,11	176	80	6,129	246	119	1,963
37	3	138,3	108	42	24,13	178	81	5,933	248	120	1,912
39	4	131,5	109	43	23,19	180	82	5,746	250	121	1,863
41	5	125,1	111	44	22,29	181	83	5,565	252	122	1,816
43	6	119,1	113	45	21,43	183	84	5,39	253	123	1,77
45	7	113,4	115	46	20,6	185	85	5,222	255	124	1,725
46	8	108	117	47	19,81	187	86	5,06	257	125	1,682
48	9	102,8	118	48	19,06	189	87	4,904	259	126	1,64

APPENDIX 4. WARRANTY POLICY

General Warranty

Dettson Industries Inc., subject to the limitations described in this Equipment Warranty Policy Certificate, warrants that each and every appliance product by Dettson Industries Inc. is, under normal operating conditions, free of defect in material and workmanship for a specific period of time from the date of original installation (as described in the "Summary of Warranty Programs" section below).

This warranty covers the appliance only and does not include labour costs, freight costs or other indirect expenses related to routine maintenance or the replacement of parts. If a part fails during the applicable warranty period, Dettson Industries Inc. will provide, at its sole discretion, a new or remanufactured part to replace the defective part at no charge. Alternatively, and at its sole discretion, Dettson Industries Inc. will allow a credit in the amount of the then factory price for a new equivalent part toward the retail purchase price of a new Dettson Industries Inc. product.

Summary of Warranty Programs

PRODUCT	PARTS
Alizé Outdoor Cooling Unit -COND-09-12-18-24 & COND-30/36	5 years
Cooling Coil	2 years
Thermostats (R02P029,R02P030 & R02P032)	5 years

Limitations

This warranty does not cover defects or damages on equipment without serial number or whose serial number has been erased or modified.

A) Consumable Items: This warranty does not apply to fan belts, filters, oil nozzles or other materials which must be replaced in the course of routine maintenance.

B) Corrosive Atmosphere: The operation of a heat exchanger in the presence of corrosive elements such as acids, chlorine, fluorine or other damaging chemicals voids this warranty.

C) External Factors: This warranty does not apply to damages to the product caused by misuse, failure to provide proper maintenance, accidents, Acts of God, improper fuel or inadequate electrical supply.

D) Unauthorized Alteration: Unauthorized alteration or repair of the appliance affecting product reliability or performance voids this warranty.

E) Installation by a qualified person: The product must be installed by a qualified fitter in accordance with Dettson Industries Inc.'s installation instructions, applicable local and national codes, the industry standards and those of professional organizations such as the Heating, Refrigeration and Air Conditioning Institute of Canada and the Air Conditioning Contractors of America. Failure to do so voids this warranty.

F) Unauthorized Installation of Accessory Equipment: Dettson Industries Inc. authorizes the application of accessory equipment which will operate in conjunction with its products provided that the following conditions are met:

i.) The function or performance of the Dettson Industries Inc. appliance is not altered.

ii.) The accessory is installed in accordance with its manufacturer's installation instructions.

iii.) The environment in which the appliance is supposed to operate is not modified.

iv.) Furnaces cannot be installed with a one hundred per cent (100%) outdoors return air.

G) Lost or Stolen Products: This warranty does not apply to products reported as lost or stolen.

H) Original Installation Site: This warranty does not apply to products no longer at the site of original installation.

I) Improper Application: This warranty does not include damages caused by improper matching or misuse of the product or its components.

J) Routine Maintenance: The warranty is valid only if the instructions specified in the Installation and Operating Instructions are strictly observed. Failure to do so may void any and all warranties, at Dettson Industries Inc.'s discretion.

Consequential Damages

Dettson Industries Inc. shall not be responsible for any consequential damages caused by any defect in the product.

Exclusive Warranty

The warranty provided by Dettson Industries Inc. is exclusive; all other representations, warranties or conditions, expressed, implied or statutory, required by law or otherwise, are hereby excluded.

Beginning of the Warranty Period

If the original sales invoice cannot be provided to establish the date of original installation, it is determined that the warranty comes into effect ninety (90) days after the product was shipped from the manufacturing plant.

Replacement Parts Warranties

All replacement parts obtained directly from Dettson Industries Inc. and used for routine maintenance of Dettson Industries Inc. products are warranted for a period of twelve (12) months from the date of repair. Dettson Industries Inc. reserves the right to require proof of repair before granting any credit. Replacement parts are shipped at the expense of the consumer. Should we request that the defective parts or components be shipped back for further investigation, a return authorization number will be issued and return freight arrangements will be specified by Dettson Industries Inc.

Warranty Execution

Dettson Industries Inc. shall not be liable for any default or delay in execution of this warranty caused by any contingency beyond our control, including wars, government restrictions or restraints, strikes, fires, floods or short or reduced supplies of raw material.