SPLIT AIR CONDITIONERS

Service Manual

ComfortStar®

CCRT (T1) 60Hz

3~5 Ton

IMPORTANT NOTE:

Read this manual carefully before operating your new air conditioning unit. Make sue to save this manual for future reference.

Please check the applicable models, technical data, F-GAS(if any) and manufacture information from the “Owner’s Manual-Product Fiche” in the packaging of the outdoor unit. (European Union products only)

Contents

※ Manufacture reserves the right to discontinue, or change at any time, specifications or designs without notices and without incurring obligations.

1. Product List

Nominal Capacity	Model		Refrigerant	Power Supply
Ton	Model Name	Function		V/Ph/Hz
3	CCRT36-1	Cooling	R410A	208-230V/1Ph/60Hz
4	CCRT48-1	Cooling		
5	CCRT60-1	Cooling		
5	CCRT60-3	Cooling		208-230V/3Ph/60Hz

2. External Appearance

3~5 Ton

3. Nomenclature

4. Features

1. The adoption of anticorrosive-box

The reinforced anticorrosion by using galvanization armor plate and coated with man-composed paint. The appearance is stylish and be easy for maintenance.
(Has been passed 1000 hours salt spray test)

2. The adoption of credible protection system

2.1 The protection of compressor

High-pressure protection, low-pressure protection, compressor current protection and so on can ensure compressor operating normally.

Adopts independent system, except for protections of sequence and wired control output, any protection relates to its corresponding compressor. Once a compressor protection energized, the corresponding compressor will stop, as others are still working.

2.2 Fan motor

The fan motors for evaporator have over-heat protection and over-current protection function. The fan motors for condenser have the temperature controller protection function.

3. Energy saving design

3.1 High efficiency compressor

Using professional compressor, heat exchanger and optimum connection pipe, the compressor can startup under low power input.

3.2 Condenser

By using the high-efficient thin wing as the heat exchanger, the waste of energy is greatly decreased.

3.3 Evaporator

By using high-efficient thin wing, the condenser has high-efficient heat exchanger, the energy waste decreases greatly.

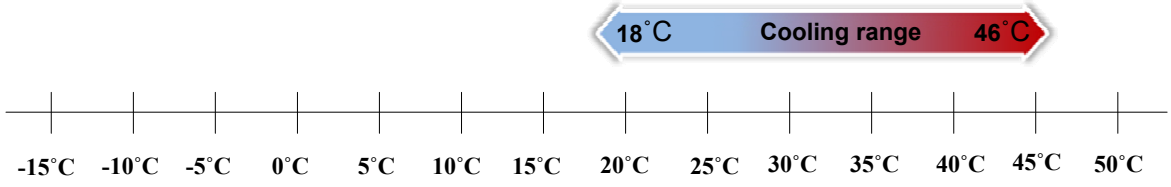
3.4 The heat insulation of indoor unit

The heat insulation of indoor unit can availably decrease heat loss.

4. Optional collocation

4.1 Wide operation temperature

The air-conditioner designed for high temperature can run despite the ambient temperature reaches up to 46℃（115℉）.



4.2 Strong air flow

Large air volume from the air inlet is forced ventilating by the condenser fan.

4.3 Minimum installation arrangement

The installation is fast and low cost with the easy installation and ready operation.

4.4 Pre-drilled duct flange

Flanges are prepared at the supply and return duct connections so that they can reduce duct connection work at site.

4.5 Quiet operation

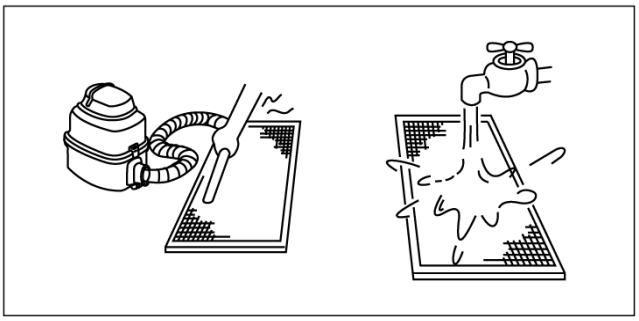
Noise and vibration have been effectively reduced by adopting new style hermetic compressor. The centrifugal fan and fan casing are optimum shaped for efficient and low noise operation.

5. Cabinet

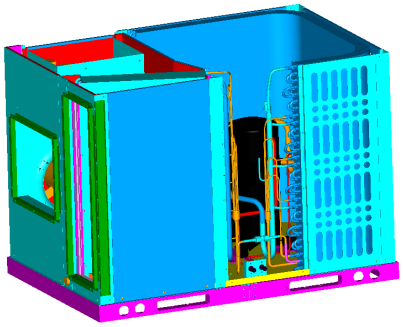
5.1 Sloped drain pan and drain pipe.

5.2 Cabinets have forklift and lifting holes for easy transportation.

5.3 The filter is washable.



5.4 Easy access doors



Provides easy access to system components for maintenance and serviceable.

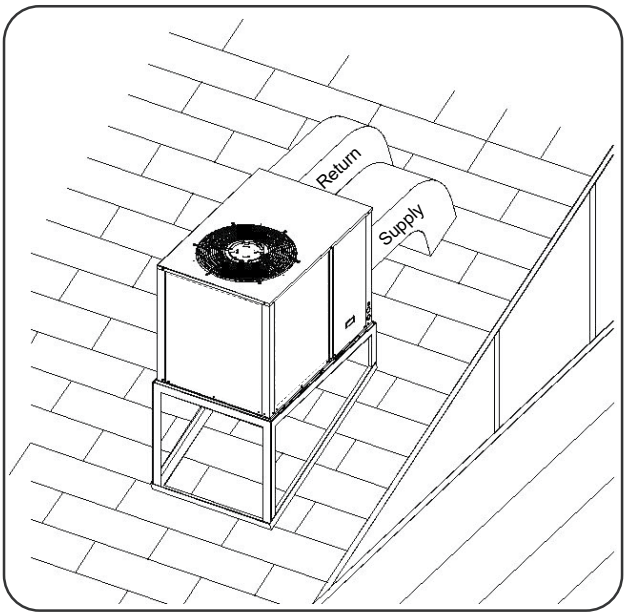
Removable access doors on the filter, fan motor, and control box sections.

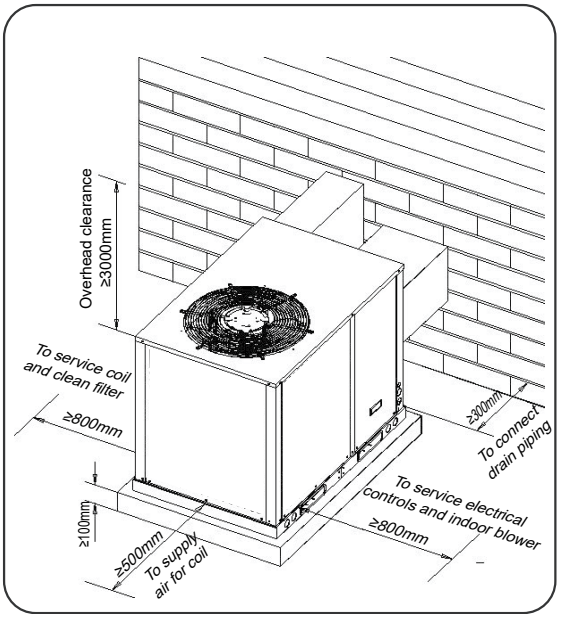
5.5 Durable construction.

Weather-resistant construction with capped seams and sloped top panels.

G90 galvanized heavy gauge plate conforming to ASTM-A-653, Zinc content of galvanized plate is 275 g/m^2 .

6. The rooftop and ground installation are optional.

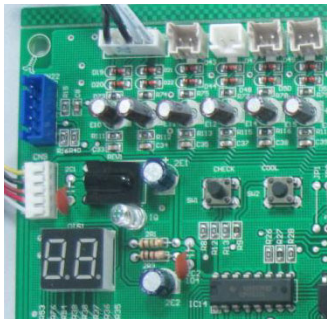




7. Easy to install, service and maintenance

Because today's owner are very cost-conscious when it comes to service and maintenance, Compact size and integrate indoor unit and outdoor unit, save the transportation, lifting and installation cost. A complete factory run test is performed on each unit without any potential start up problem.

8. System self-diagnostic function



The system self-diagnostic function, press the "check" button, the LED displays the normal checking code. When the unit is in running with abnormal operation, the LED will display the malfunction code and the unit will stop running to protect the unit.

5. List of Functions

5.1 Standard specifications

A. General

Packaged cooling is suitable for mounting on the roof or ground. The packaged unit consists of scroll compressors, evaporator coil, condenser coil, control wiring and interconnecting piping- all factory assembled and mounted on heavy gauge G-90 galvanized steel sheet press formed base, ready for field connection to utilities and ducts. The packaged unit is of rigid construction with holes provided in the base rails for overhead rigging. The unit is provided with an integral weather resistant control panel.

B. Unit enclosure

Panels are of heavy gauge, G-90 galvanized steel sheet with removable access panels, completely weatherized for outdoor installation and properly reinforced and brazed. Panels and access door are provided for inspection and access for all internal parts. Enclosures are provided with adequately reinforced points of support for setting in the unit. Steel sheet panels are zinc-coated and galvanized by the hot dip process of lock forming quality conforming to ASTM A 653 commercial weight G-90, followed by baked on electrostatic polyester dry powder coat paint, on all external panel.

C. Compressor

All the models adopt scroll compressors which will be provided with all the standard controls and accessories necessary for safe operation. These are equipped with internal motor protector; factory installed crank case heater and rubber vibration isolator for quiet and efficient operation.

D. Air-cooled condensing section

1. The air-cooled condensing section is enclosed within the unit housing and consists of condenser coil, fan(s) electric motor(s) and inherently protected compressor(s). Inner grooved copper tubes with wall thickness of 0.3mm, mechanically bonded to enhanced louvered aluminum fins are standard for all condenser coils. As an option, enhanced coated aluminum fins may be provided. Tube support sheets are galvanized steel, formed to provide structural strength.
2. Fans are axial type, directly driven, upward discharge and provided with fan grille mounted on the casing.
3. Motors are totally enclosed air-over type with class F insulation. Inherent thermal protection is automatic reset type.

E. Evaporator coil section

1. All cooling coils are of enhanced louvered fins and inner grooved copper tubes with wall thickness of 0.3mm, mechanically bonded to aluminum fins. As option, enhanced coated aluminum fins may be provided. Tube support sheets are galvanized steel, formed to provide structural strength.
2. Drainage pan: An insulated drainage pan made of G-90 galvanized steel is provided, for additional corrosion protection.
3. Insulation: Insulation is supplied in adequate density and thickness for all units to prevent condensation from forming on the unit casing. Insulation meets the requirements of NFPA 90A and is protected against deterioration and erosion from air currents.

F. Evaporator fan

Evaporator fan adopts centrifugal forward-curved blade design and meets the handling total required CFM , static pressure in the low and the medium ranges. Casings are made of galvanized steel. Blower motors adopt open drip proof type (totally enclosed types are optional) and conform to NEMA MG-1 and MG-2. Blower motor is mounted on adjustable base and secured by locking device. Shaft is turned, ground

and polished from solid steel. Fans and pulleys are keyed to shaft and designed for continuous operation at maximum motor horse power and fan speed. All rotating components and assemblies are statically and dynamically balanced and every unit is vibration tested before shipment from the factory.

5.2 Standard features/optional features

Description	Standard features	Optional features
Horizontal discharge	◆	
Compressor crankcase heaters	◆	
Indoor fan, centrifugal fan	◆	
Outdoor fan-direct drive, axial type	◆	
Outdoor fan motor-totally enclosed air-over type	◆	
Filter, Nylon (Thickness 10mm)		◆
Compressor overload protection	◆	
Low &high pressure switch	◆	
Condenser fan guard	◆	
Condenser coil guard	◆	
Wired controller CSW23B-K1A-K1A		◆
Wired controller CSW23B-K1A-K1A		◆
Drainage pipe		◆
Drainage outlet		◆
Snap ring		◆

6. Specification

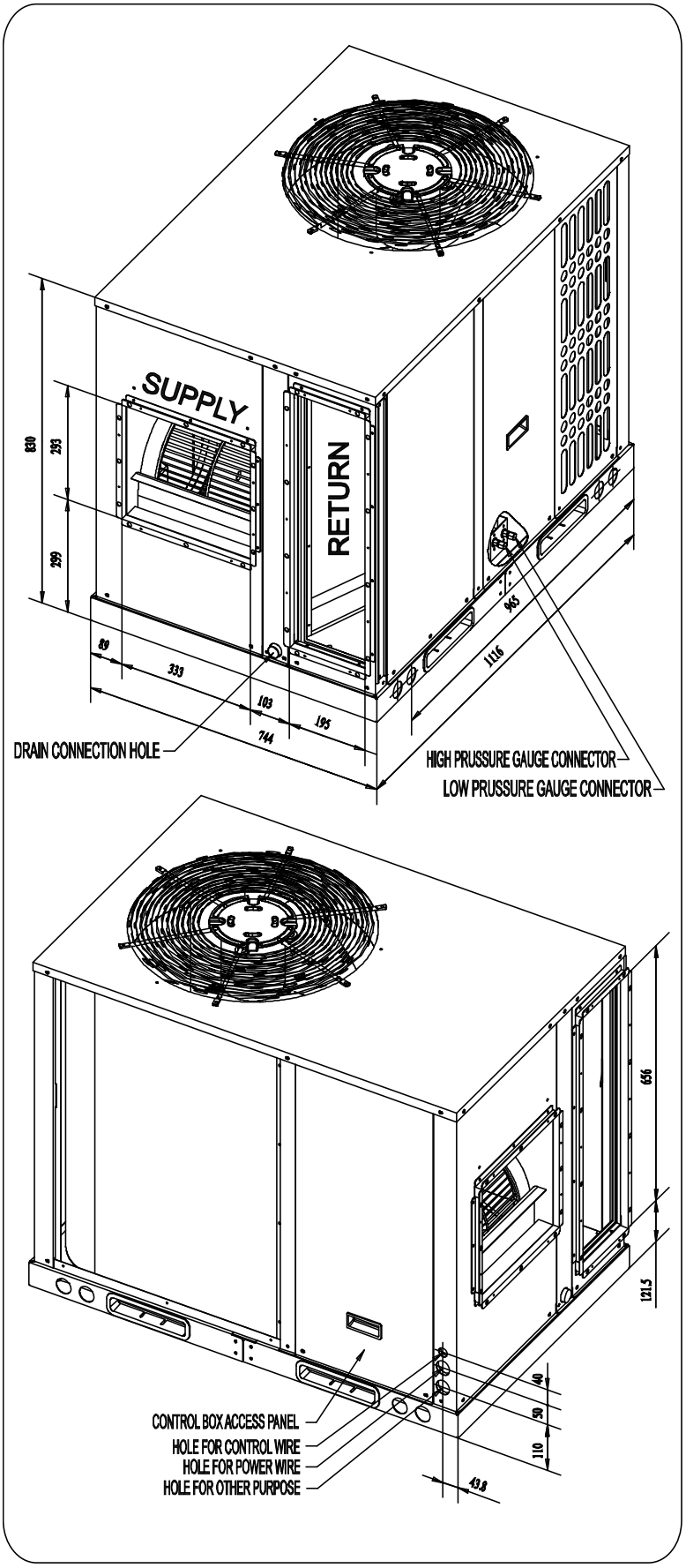
Model			CCRT36-1	CCRT48-1	CCRT60-1	CCRT60-3
Power supply		V/Ph /Hz	208~230/1/60	208~230/1/60	208~230/1/60	208~230/3/60
Cooling	Capacity	Btu/h	36000	48000	60000	60000
	SEER	Btu/h.W	10	10	10	10
Electrical data	Max. input consumption	KW	4.5	7.5	8.8	7.8
	Max. power input	A	24.8	41.5	48.4	25.5
Compressor	Model		APA032KAB	ABA051KAB	ABA054KAE	ZP57K3E-TF5-522
	Type		Scroll	Scroll	Scroll	Scroll
	Brand		LG	LG	LG	Copeland
	Rated current(RLA)	A	14	21.5	23	16.3
	Locked rotor Amp(LRA)	A	70	125	120	155
	Thermal protector		239℉~257℉ (115℃-125℃)	239℉~257℉ (115℃-125℃)	239℉~257℉ (115℃-125℃)	275℉(135℃)
	Refrigerant oil	ml	800	1300	1300	1591
Indoor fan motor	Model		YDK270-6E	YDK400-6E	YDK600-6E	YDK600-6E
	Type		AC motor	AC motor	AC motor	AC motor
	Brand		Welling/DaYang	Welling/DaYang	Welling/DaYang	Welling/DaYang
	Output	HP	1/3	1/2	4/5	4/5
	Rated current	A	1.41	2.08	2.33	2.33
	Capacitor	uF	10	20	20	20
	RPM	r/min	400	890	990	990
Indoor fan	Material		Metal	Metal	Metal	Metal
	Type		Centrifugal fan	Centrifugal fan	Centrifugal fan	Centrifugal fan
	Diameter	Inch(mm)	11.1(282)	11.1(282)	11.1(282)	11.1(282)
	Height	Inch(mm)	10.7(272)	10.7(272)	10.7(272)	10.7(272)
Indoor coil	Number of rows		3	3	4	4
	Tube pitch(a)x row pitch(b)	Inch(mm)	0.8×0.5(21×13.37)	0.8×0.5(21×13.37)	0.8×0.5(21×13.37)	0.8×0.5(21×13.37)
	Fin spacing	Inch(mm)	5.9(1.5)	5.9(1.5)	5.9(1.5)	5.9(1.5)
	Fin type		Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside diameter and type	Inch(mm)	Φ1/16(Φ7)	Φ1/16(Φ7)	Φ1/16(Φ7)	Φ1/16(Φ7)
		Type	Inner grooved tube	Inner grooved tube	Inner grooved tube	Inner grooved tube
	Coil length x height	Inch(mm)	16.6×28(421×714)	16.6×28(421×714)	16.6×28(421×714)	16.6×28(421×714)
	Number of circuits		8	8	8	8
ESP		Pa	50	50	50	50
Indoor fan air flow		CFM	1380	1400	1450	1450

Outdoor fan motor	Model		YDK180-6B	YDK180-6B	YDK180-6B	YDK180-6B
	Type		AC motor	AC motor	AC motor	AC motor
	Brand		Welling	Welling	Welling	Welling
	Output	HP	1/3	1/3	1/3	1/3
	Rated current	A	2	2	2	2
	Capacitor	uF	12	12	12	12
	RPM	r/min	1075	1075	1075	1075
Outdoor fan	material		Alnico	Alnico	Alnico	Alnico
	Type		Axial flow fan	Axial flow fan	Axial flow fan	Axial flow fan
	Diameter	Inch(mm)	22.7(550)	22.7(550)	22.7(550)	22.7(550)
	Height	Inch(mm)	4(102.5)	4(102.5)	4(102.5)	4(102.5)
Outdoor coil	Number of rows		1	1.7	2	2
	Tube pitch(a)x row pitch(b)	Inch(mm)	0.8×0.5(21×13.37)	0.8×0.5(21×13.37)	0.8×0.5(21×13.37)	0.8×0.5(21×13.37)
	Fin spacing	Inch(mm)	5.9(1.5)	5.9(1.5)	5.9(1.5)	5.9(1.5)
	Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside diameter and type	Inch(mm)	Φ1/16(Φ7)	Φ1/16(Φ7)	Φ1/16(Φ7)	Φ1/16(Φ7)
		Type	Inner grooved tube	Inner grooved tube	Inner grooved tube	Inner grooved tube
	Coil length x height	Inch(mm)	1513×756	1480×756	1480×756	1480×756
	Number of circuits		1	1	1	1
Dimension	Net (W×H×D)	mm	1116×830×744	1116×830×744	1116×830×744	1116×830×744
	Packing(W×H×D)	mm	1152×855×765	1152×855×765	1152×855×765	1152×855×765
Weight	Net/Gross weight	Kg	132/135	141/144	151/154	151/154
Charged refrigerant			R410A/1600g	R410A/2200g	R410A/2750g	R410A/2550g
Optional Controller			CSW23B-K1A	CSW23B-K1A	CSW23B-K1A	CSW23B-K1A
Operation temp.		℃	17~30	17~30	17~30	17~30
		℉	62.6~86	62.6~86	62.6~86	62.6~86
Ambient temp.	Cooling	℃	18~46	18~46	18~46	18~46
		℉	64.4~114.8	64.4~114.8	64.4~114.8	64.4~114.8
Filter	Type		Nylon	Nylon	Nylon	Nylon
	Quantity	Pieces	1	1	1	1
	Size (W×H×D)	mm	197x670x10	197x670x10	197x670x10	197x670x10
Shipping	Qty'Per 20'/40'/40'HQ	Pieces	30/62/91	30/62/91	30/62/91	30/62/91

Note:
The data are based on the following conditions:
Cooling: Indoor Temperature 26.7°C(80°F) DB / 19.4°C(67°F) WB; - Outdoor Temperature 35°C(95°F) DB.

7. Dimensional Drawing

3~5ton

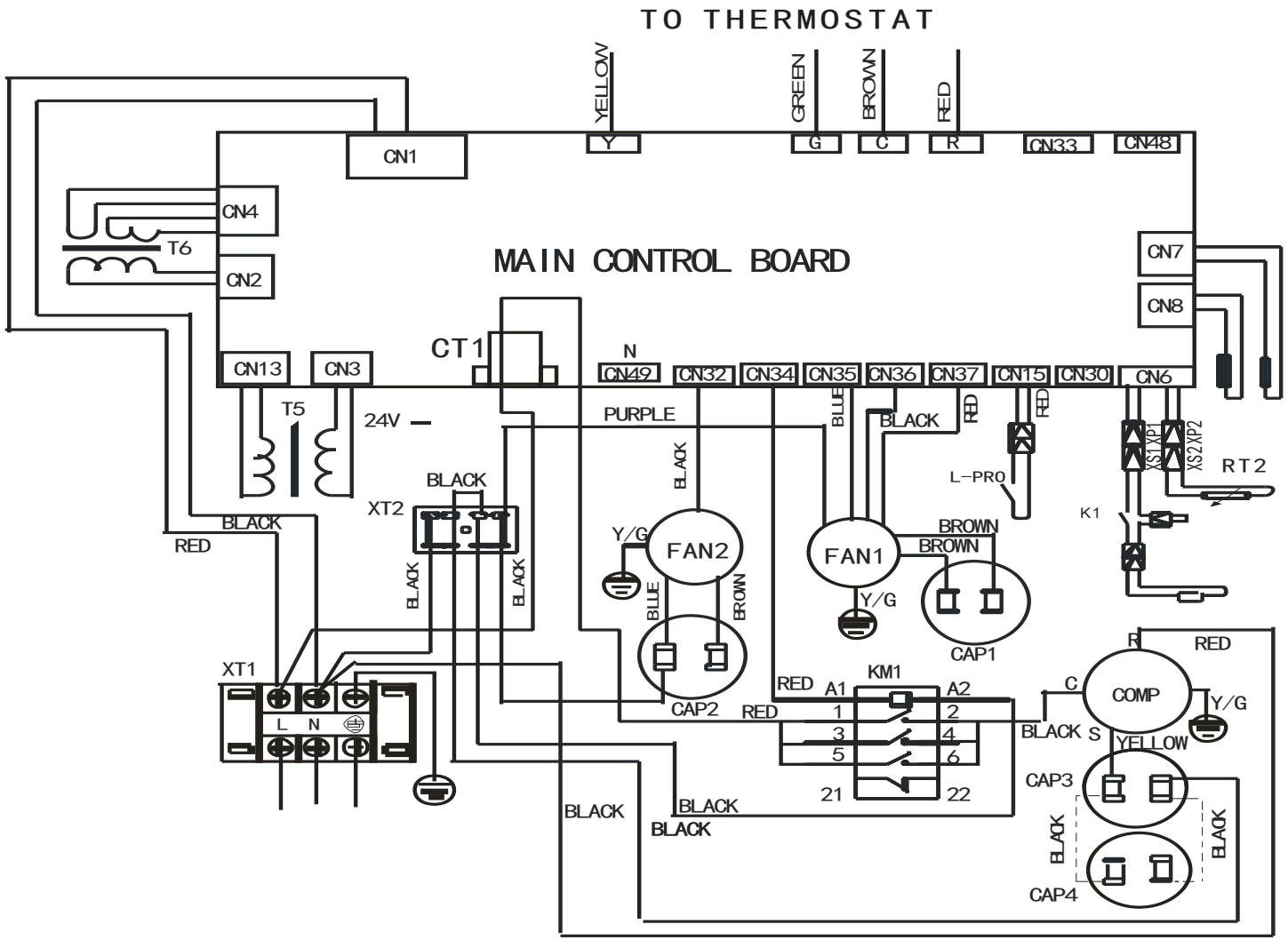


8. Wiring Diagram

CCRT36-1

WIRING DIAGRAM

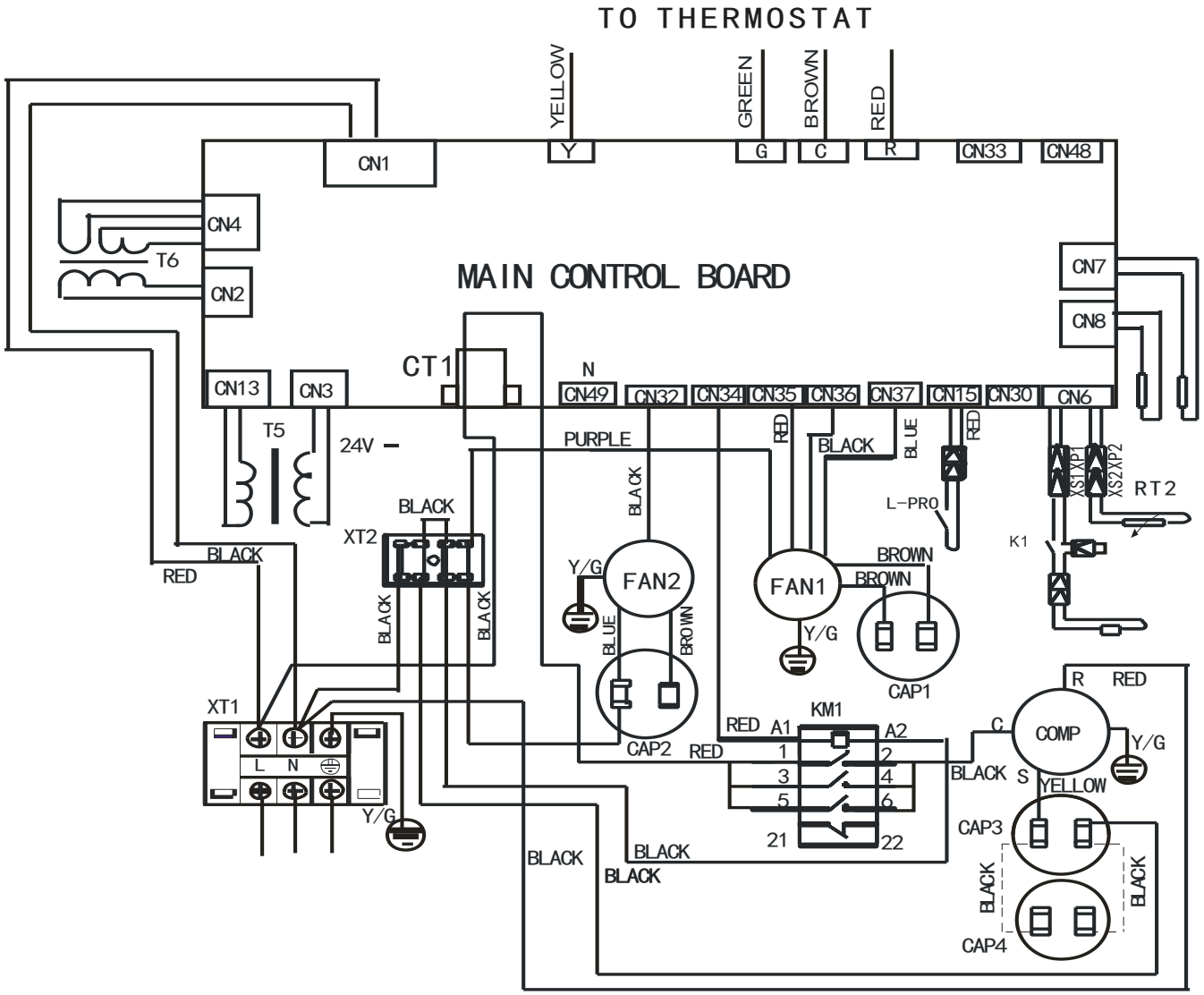
CODE	PART NAME
COMP	COMPRESSOR
FAN1	INDOOR FAN
FAN2	OUTDOOR FAN
CAP1	INDOOR FAN CAP
CAP2	OUTDOOR FAN CAP
XP1~2	CONNECTORS
XS1~2	CONNECTORS
RT2	TEMP. SENSOR
KM1	AC CONTACTOR
T5	TRANSFORMER(24V~)
T6	TRANSFORMER
K1	COMP. TOP SENSOR
K2	COMP. TEMP. SWITH
L-PRO	LOW PRESS SWITCH
XT1	2-WAY TERMINAL
XT2	MIDDLE TERMINAL
CAP3~4	COMP RUNNING CAP



CCRT48-1

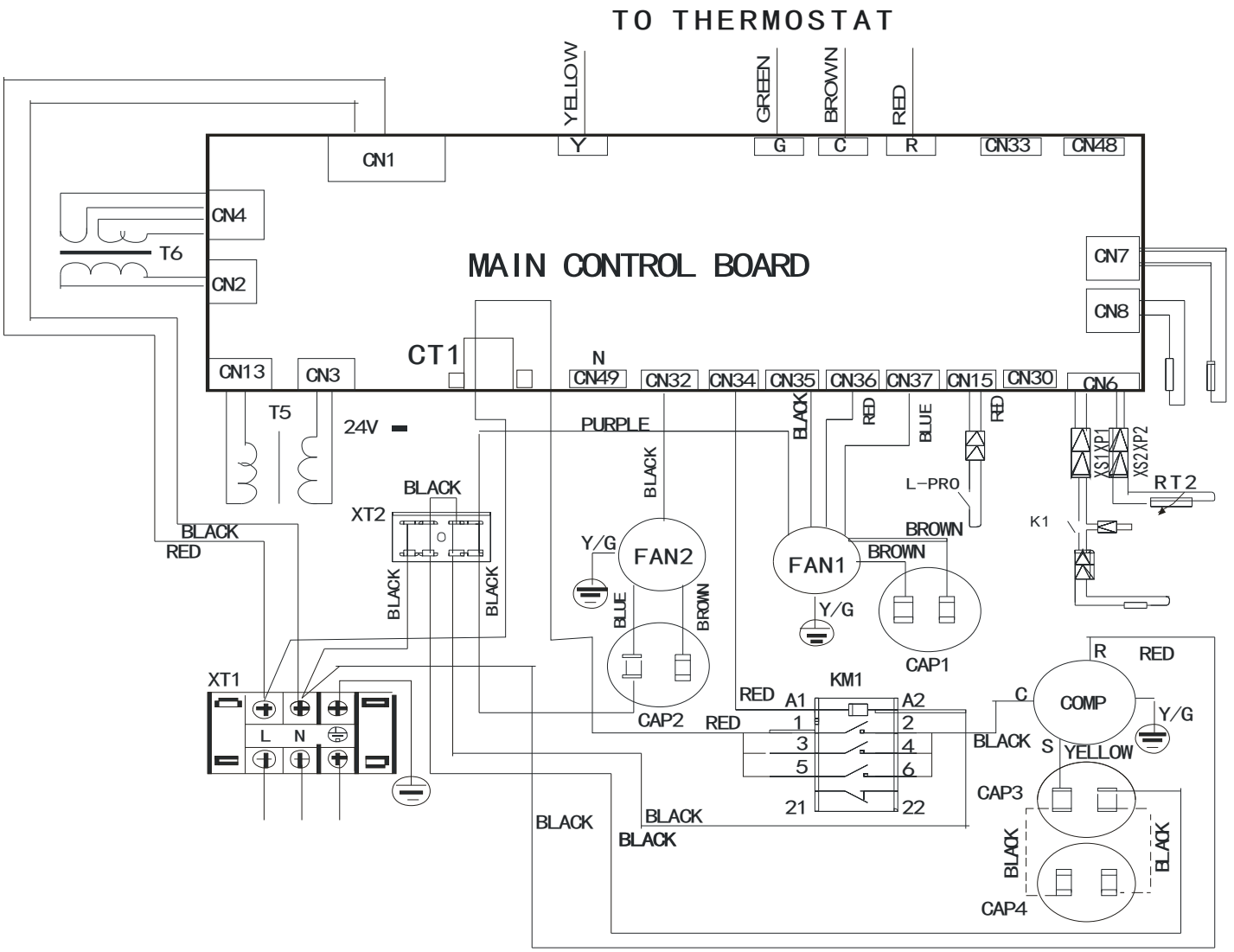
WIRING DIAGRAM

CODE	PART NAME
COMP	COMPRESSOR
FAN1	INDOOR FAN
FAN2	OUTDOOR FAN
CAP1	INDOOR FAN CAP
CAP2	OUTDOOR FAN CAP
XP1~2	CONNECTORS
XS1~2	CONNECTORS
RT2	TEMP. SENSOR
KM1	AC CONTACTOR
T5	TRANSFORMER(24V~)
T6	TRANSFORMER
K1	COMP. TOP SENSOR
K2	COMP. TEMP. SWITH
L-PRO	LOW PRESS SWITCH
XT1	2-WAY TERMINAL
XT2	MIDDLE TERMINAL
CAP3~4	COMP RUNNING CAP

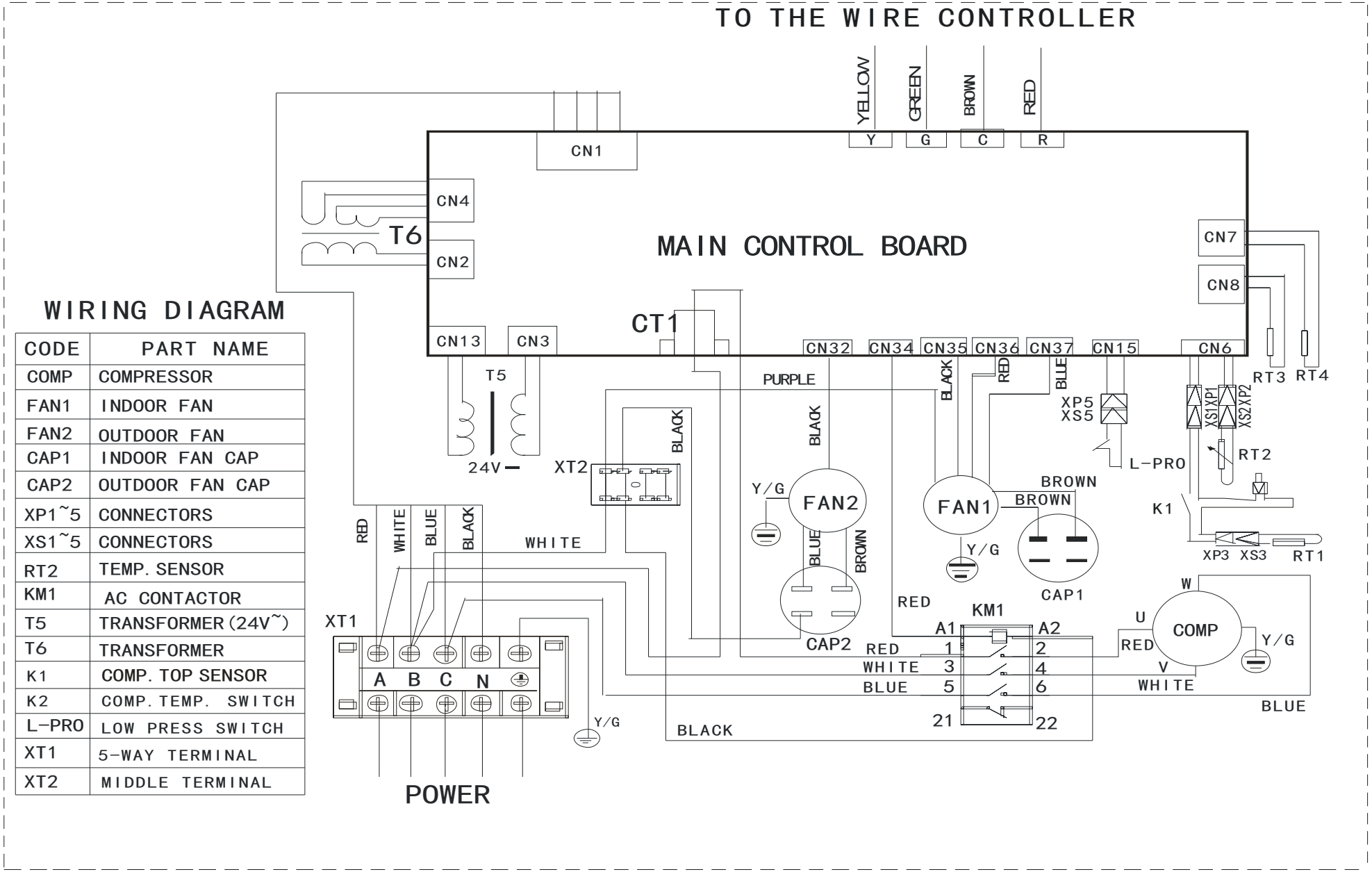


WIRING DIAGRAM

CODE	PART NAME
COMP	COMPRESSOR
FAN1	INDOOR FAN
FAN2	OUTDOOR FAN
CAP1	INDOOR FAN CAP
CAP2	OUTDOOR FAN CAP
XP1~2	CONNECTORS
XS1~2	CONNECTORS
RT2	TEMP. SENSOR
KM1	AC CONTACTOR
T5	TRANSFORMER(24V~)
T6	TRANSFORMER
K1	COMP. TOP SENSOR
K2	COMP. TEMP. SWITH
L-PRO	LOW PRESS SWITCH
XT1	2-WAY TERMINAL
XT2	MIDDLE TERMINAL
CAP3~4	COMP RUNNING CAP



CCRT60-3



WIRING DIAGRAM

CODE	PART NAME
COMP	COMPRESSOR
FAN1	INDOOR FAN
FAN2	OUTDOOR FAN
CAP1	INDOOR FAN CAP
CAP2	OUTDOOR FAN CAP
XP1~5	CONNECTORS
XS1~5	CONNECTORS
RT2	TEMP. SENSOR
KM1	AC CONTACTOR
T5	TRANSFORMER(24V~)
T6	TRANSFORMER
K1	COMP. TOP SENSOR
K2	COMP. TEMP. SWITCH
L-PRO	LOW PRESS SWITCH
XT1	5-WAY TERMINAL
XT2	MIDDLE TERMINAL

9. Performance Data

9.1 Cooling capacity for 3 ton:

		Air Flow	CFM	1200				1075			
		Ent (DB)	(°F)	75	80	85	90	75	80	85	90
Ambient Temperature (°F)	75	61	TC	36.5	38.3	41.7	43.0	35.2	37.0	40.3	41.5
			SC	28.4	29.8	32.2	33.0	27.4	28.8	31.0	31.9
		67	TC	37.7	39.6	42.7	44.0	36.4	38.2	41.2	42.4
			SC	28.1	29.1	31.4	32.3	27.1	28.1	30.3	31.2
		73	TC	38.6	40.5	43.8	44.9	37.3	39.1	42.3	43.3
			SC	27.8	28.5	30.7	31.6	26.8	27.5	29.6	30.5
	85	61	TC	34.2	35.9	39.1	40.3	33.0	34.6	37.7	38.9
			SC	26.9	28.3	30.5	31.3	26.0	27.3	29.5	30.2
		67	TC	35.3	37.0	40.0	41.2	34.0	35.7	38.6	39.7
			SC	26.3	27.6	29.8	30.7	25.4	26.6	28.8	29.6
		73	TC	36.1	38.0	41.0	42.0	34.9	36.6	39.6	40.6
			SC	25.4	26.8	29.1	30.0	24.6	25.8	28.1	29.0
	95	61	TC	31.8	33.4	36.1	37.2	30.7	32.3	34.9	35.9
			SC	25.4	26.7	28.8	29.5	24.6	25.8	27.8	28.5
		67	TC	32.7	34.4	37.3	38.4	31.6	33.2	36.0	37.0
			SC	24.7	26.1	28.0	28.9	23.9	25.2	27.0	27.9
		73	TC	33.7	35.4	38.2	39.2	32.5	34.1	36.9	37.8
			SC	24.4	25.6	27.6	28.5	23.5	24.7	26.7	27.5
	105	61	TC	29.6	31.1	33.8	34.9	28.6	30.0	32.6	33.6
			SC	24.3	25.5	27.5	28.2	23.4	24.6	26.6	27.3
		67	TC	30.5	32.0	34.6	35.7	29.4	30.9	33.4	34.4
			SC	24.0	25.2	27.2	28.0	23.1	24.3	26.3	27.0
		73	TC	31.3	32.9	35.5	36.3	30.2	31.7	34.3	35.1
			SC	23.5	24.7	27.0	27.8	22.7	23.9	26.1	26.8
	115	61	TC	27.2	28.5	31.1	32.0	26.2	27.5	30.0	30.9
			SC	23.4	24.6	26.8	27.4	22.6	23.7	25.8	26.5
		67	TC	28.0	35.1	31.9	32.9	27.0	33.9	30.8	31.8
			SC	23.1	23.6	25.9	26.9	22.3	22.8	25.0	26.0
		73	TC	28.6	30.0	32.7	33.6	27.6	29.0	31.6	32.4
			SC	23.0	23.3	25.4	26.2	22.2	22.5	24.5	25.3

Entering Wet Bulb(°F)

Notes: 1. All capacities are net and have considered indoor fan heat.
2. TC=Total Capacity. (Unit: 1000Btu/h).
3. SC=Sensible Capacity. (Unit: 1000Btu/h).
4. Different air volume in the above table,need to adjust in the field.

9.2 Cooling capacity for 4Ton:

Air Flow			CFM	1500				1200			
Ent (DB)			(°F)	75	80	85	90	75	80	85	90
Ambient Temperature (°F)	75	Entering Wet Bulb(°F) 61	TC	48.5	51.0	55.6	57.3	46.6	49.0	53.4	55.0
			SC	34.2	35.9	38.8	39.9	32.9	34.6	37.3	38.4
		67	TC	50.2	52.7	56.9	58.5	48.2	50.6	54.6	56.2
			SC	33.9	35.1	37.9	39.0	32.6	33.7	36.4	37.5
		73	TC	51.4	54.0	58.3	59.8	49.4	51.8	56.0	57.4
			SC	33.5	34.4	37.0	38.1	32.2	33.1	35.6	36.6
	85	61	TC	45.5	47.8	52.1	53.7	43.7	45.9	50.0	51.6
			SC	32.5	34.1	36.9	37.8	31.3	32.8	35.5	36.4
		67	TC	46.9	49.3	53.2	54.8	45.1	47.4	51.1	52.7
			SC	31.7	33.3	35.9	37.0	30.5	32.0	34.6	35.6
		73	TC	48.1	50.5	54.6	56.0	46.2	48.5	52.4	53.8
			SC	30.7	32.3	35.2	36.2	29.5	31.1	33.8	34.8
	95	61	TC	42.4	44.5	48.1	49.5	40.7	42.8	46.2	47.5
			SC	30.7	32.2	34.8	35.7	29.5	31.0	33.5	34.3
		67	TC	43.6	45.8	49.6	51.1	41.9	44.0	47.7	49.1
			SC	29.9	31.5	33.8	34.9	28.7	30.3	32.5	33.6
		73	TC	44.8	47.1	50.8	52.1	43.0	45.2	48.8	50.1
			SC	29.4	30.9	33.4	34.4	28.3	29.7	32.1	33.1
	105	61	TC	39.4	41.4	45.0	46.4	37.8	39.7	43.3	44.6
			SC	29.3	30.8	33.2	34.1	28.2	29.6	32.0	32.8
		67	TC	40.6	42.7	46.0	47.5	39.0	41.0	44.2	45.6
			SC	28.9	30.4	32.9	33.8	27.8	29.3	31.6	32.5
		73	TC	41.7	43.7	47.3	48.4	40.0	42.0	45.4	46.5
			SC	28.4	29.9	32.6	33.5	27.3	28.7	31.3	32.2
	115	61	TC	36.2	37.9	41.4	42.6	34.8	36.4	39.7	40.9
			SC	28.2	29.6	32.3	33.1	27.1	28.5	31.1	31.8
		67	TC	37.3	46.7	42.5	43.8	35.8	44.9	40.8	42.1
			SC	27.9	28.5	31.3	32.5	26.9	27.4	30.1	31.3
		73	TC	38.1	40.0	43.6	44.7	36.6	38.4	41.9	43.0
			SC	27.8	28.1	30.6	31.6	26.7	27.1	29.5	30.4

Notes: 1. All capacities are net and have considered indoor fan heat.
2. TC=Total Capacity. (Unit: 1000Btu/h).
3. SC=Sensible Capacity. (Unit: 1000Btu/h).
4. Different air volume in the above table,need to adjust in the field.

9.3 Cooling capacity for 5 Ton(208-230V/1N/60Hz)):

		Air Flow		CFM	1500			
		Ent (DB)		(°F)	75	80	85	90
Ambient Temperature (°F)	75	Entering Wet Bulb(°F)	61	TC	60.5	63.6	69.3	71.4
				SC	41.3	43.4	46.8	48.1
			67	TC	62.5	65.7	70.9	73.0
				SC	40.9	42.3	45.7	47.1
			73	TC	64.1	67.3	72.7	74.5
				SC	40.4	41.5	44.7	45.9
	85		61	TC	56.7	59.6	64.9	66.9
				SC	39.2	41.2	44.5	45.6
			67	TC	58.5	61.5	66.3	68.3
				SC	38.3	40.2	43.4	44.7
			73	TC	60.0	63.0	68.0	69.8
				SC	37.1	39.0	42.4	43.7
	95		61	TC	52.8	55.5	60.0	61.7
				SC	37.1	38.9	42.0	43.0
			67	TC	54.3	57.1	61.9	63.7
				SC	36.0	38.0	40.8	42.1
			73	TC	55.9	58.7	63.4	65.0
				SC	35.5	37.2	40.2	41.5
	105		61	TC	49.1	51.6	56.1	57.9
				SC	35.3	37.1	40.1	41.1
			67	TC	50.6	53.2	57.4	59.2
				SC	34.9	36.7	39.6	40.8
			73	TC	52.0	54.5	58.9	60.3
				SC	34.3	36.0	39.3	40.4
	115		61	TC	45.1	47.3	51.6	53.1
				SC	34.0	35.8	39.0	39.9
			67	TC	46.4	58.2	53.0	54.6
				SC	33.7	34.4	37.7	39.2
			73	TC	47.5	49.9	54.3	55.8
				SC	33.5	33.9	37.0	38.1

9.4 Cooling capacity for 5 Ton(208-230V/3N/60Hz)):

		Air Flow		CFM	1500			
		Ent(DB)		(ºF)	75	80	85	90
Ambient Temperature(ºF)	75	Enteing Wet Bulb(ºF)	61	TC	60.4	63.5	69.2	71.3
				SC	41.2	43.2	46.7	48.0
			67	TC	62.4	65.6	70.8	72.9
				SC	40.7	42.2	45.6	46.9
			73	TC	64.0	67.2	72.6	74.4
				SC	40.3	41.4	44.5	45.8
	85		61	TC	56.6	59.5	64.8	66.8
				SC	39.1	41.1	44.4	45.5
			67	TC	58.4	61.4	66.2	68.2
				SC	38.2	40.1	43.2	44.5
			73	TC	59.9	62.9	67.9	69.6
				SC	37.0	38.8	42.3	43.6
	95		61	TC	52.7	55.4	59.9	61.6
				SC	37.0	38.8	41.9	42.9
			67	TC	54.2	57.0	61.8	63.6
				SC	35.9	37.9	40.7	42.0
			73	TC	55.8	58.6	63.3	64.9
				SC	35.4	37.1	40.1	41.3
	105		61	TC	49.0	51.5	56.1	57.8
				SC	35.2	37.0	40.0	41.0
			67	TC	50.5	53.1	57.3	59.1
				SC	34.8	36.6	39.5	40.7
			73	TC	51.9	54.4	58.8	60.2
				SC	34.2	35.9	39.2	40.3
	115		61	TC	45.0	47.2	51.5	53.0
				SC	33.9	35.7	38.8	39.8
			67	TC	46.4	58.1	52.9	54.5
				SC	33.6	34.3	37.6	39.1
			73	TC	47.4	49.8	54.2	55.7
				SC	33.4	33.9	36.9	38.0

Notes: 1. All capacities are net and have considered indoor fan heat.

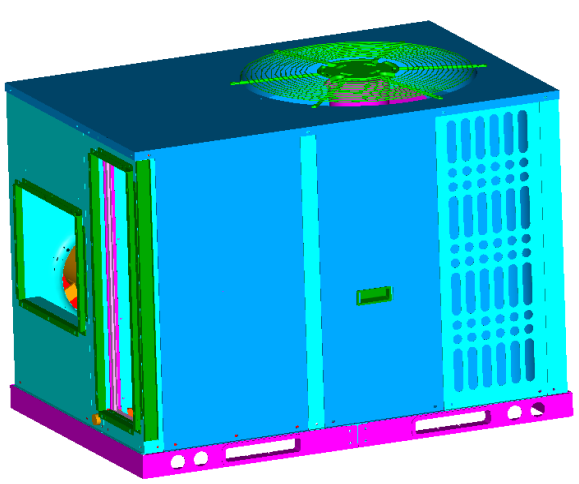
2. TC=Total Capacity. (Unit: 1000Btu/h).

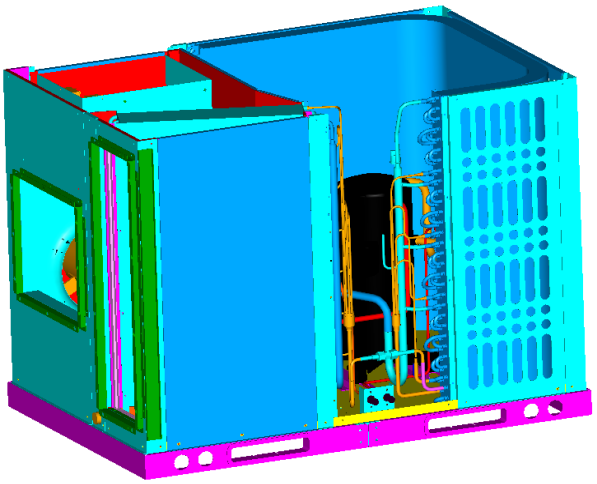
3. SC=Sensible Capacity. (Unit: 1000Btu/h).

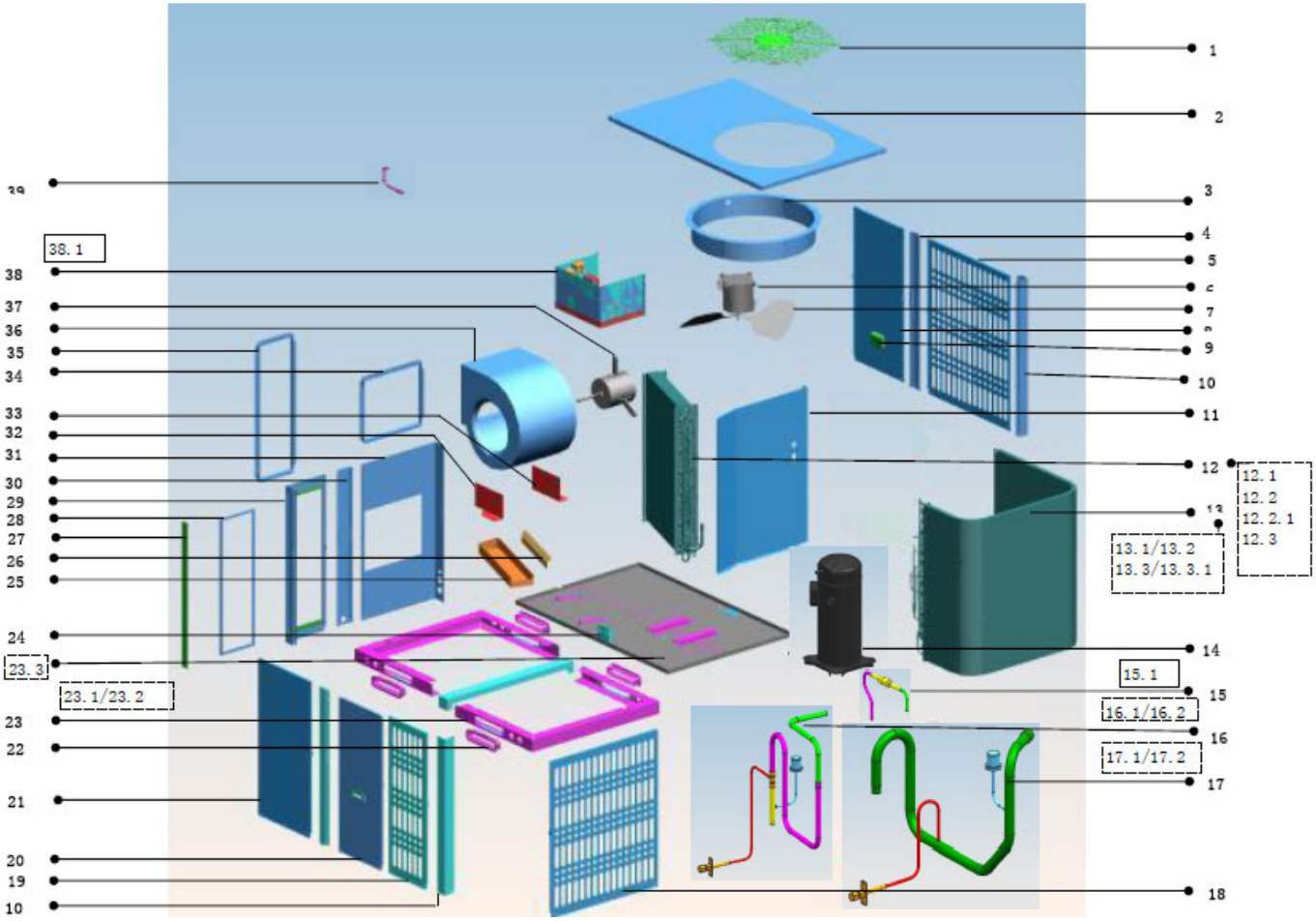
4. Different air volume in the above table,need to adjust in the field.

10. Explode View

10.1 Explode view for 3,4,5 ton







No.	Part Name	Qty	No.	Part Name	Qty
1	Net	1	21	Rear cover ass'y	1
2	Top cover ass'y	1	22	Board	4
3	Ring	1	23	Base ass'y	1
4	Former pole	2	23.1	Base	2
5	Gridding I	1	23.2	Strengthen board I	1
6	Motor	1	23.3	Base	1
7	Axial flow fan	1	24	Installation board	1
8	Front cover plate ass'y	1	25	Drainage pan	1
9	Handle	2	26	Drainage pan waterproof board	1
10	Left pole	2	27	Filter shutter	1
11	Partition board ass'y	1	28	Filter	1
12	Evaporator ass'y	1	29	Cover	1
12.1	Evaporator ass'y	1	30	Cover	1
12.2	Evaporator input pipe ass'y	1	31	Cover	1
12.2.1	Distributor	1	32	Supporter boarding II	1
12.3	Evaporator output pipe ass'y	1	33	Supporter boarding I	1
13	Condenser ass'y	1	34	Air outlet flange ass'y	1
13.1	Condenser	1	35	Return air flange	1
13.2	Condenser inlet pipe ass'y	1	36	Centrifugal Fans	1
13.3	Condenser output pipe ass'y	1	37	Motor	1
13.3.1	Distributor	1	38	Rooftop electrical box ass'y	1
14	Compressor	1	38.1	E-part box	1
15	Throttle valve ass'y	1	38.2	Main control board ass'y	1
15.1	Throttle	1	38.3	AC contactor	1
16	Compressor's discharge pipe ass'y	1	38.4	Transformer	1
16.1	Pipe joint	1	38.5	24V AC transformer	1
16.2	Pipe for high pressure gauge port	1	38.6	Compressor capacitor	2
17	Compressor's suction pipe ass'y	1	38.7	Compressor capacitor	1
17.1	Pipe joint	1	38.8	Wire joint	1
17.2	Pipe for low pressure gauge port	1	38.9	Wire joint	1
18	Gridding II	1	39	Coil temp. sensor ass'y	1
19	Rear cover ass'y	1	40	Refrigerant	2
20	Rear cover ass'y	1			

11. Electrical Data

Model	Power Supply			Compressor				Evaporator fan motor			Condenser fan motor		
	MCA	TOCA	MFA	STC	RNC	IP	Qty	FLA	IPT	Qty	FLA	IP	Qty
CCRT36-1	26.6	27.2	40	112	17.9	3.54	1	2	0.47	1	2.06	0.468	1
CCRT48-1	37.8	42	60	134	26.4	4.86	1	2	0.47	1	2.52	0.572	1
CCRT60-1	46.8	47.3	80	172	33.6	5.6	1	2	0.47	1	2.76	0.61	1
CCRT60-3	22.3	25.5	35	155	16.3	5.5	1	3.15	0.6	1	2	0.18	1

MCA: Min. Current Amps. (A) **TOCA:** Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A) **STC:** Starting Current (A)

RNC: Running Current (A) **IP:** Input (kW)

Note:

1. These data are based on the following conditions:
   Evaporator Air Input Temperature 85° F DB, 66 ° F WB.
   Condenser Air Input Temperature 115° F DB.
2. The starting current is indicated for each compressor motor.
3. The maximum currents of the compressor can be estimated as follows.

	One compressor unit	Two compressor unit
Max. current	RNC×Max. IPT×/IPT	RNC×Max. IPT×/IPT
Max. instantaneous current	STC	STC+RNC×0.5×Max. IPT×/IPT

Max. IPT×: Compressor power input from the performance table at the expected maximum condition

STC, IPT, RNC: Compressor data from the above table

4. The data in the compressor motor column shall indicate the respective values of the refrigeration cycle.

Voltage imbalance between phases to be <2%.

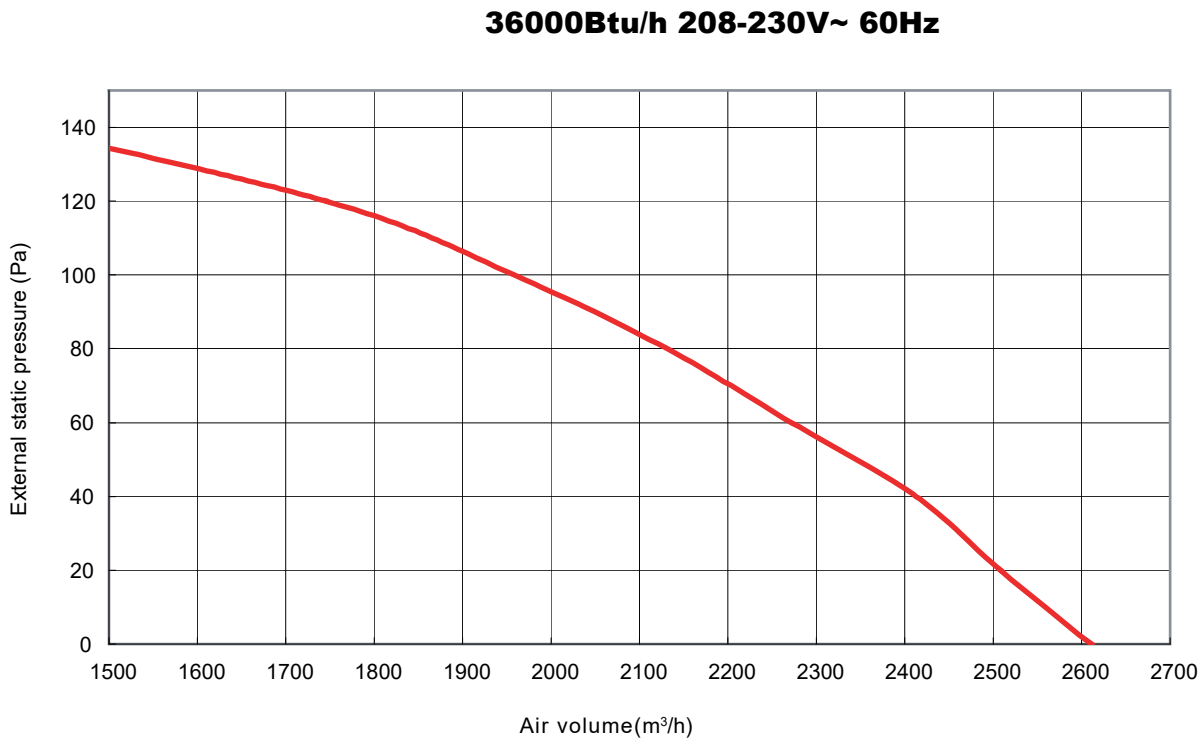
12. Parameter and Pressure Chart for Air Volume

12.1 Model:3 ton

Parameter table for indoor unit air volume:

Static pressure (Pa)	0	20	40	60	80	100	120
Air flow (m3/h)	2612	2505	2430	2282	2134	1967	1735
Brake power (W)	488	476	468	464	457	449	442
Fan speed (rpm)	857	892	914	925	940	956	974

Curve diagram of static pressure, air flow volume:

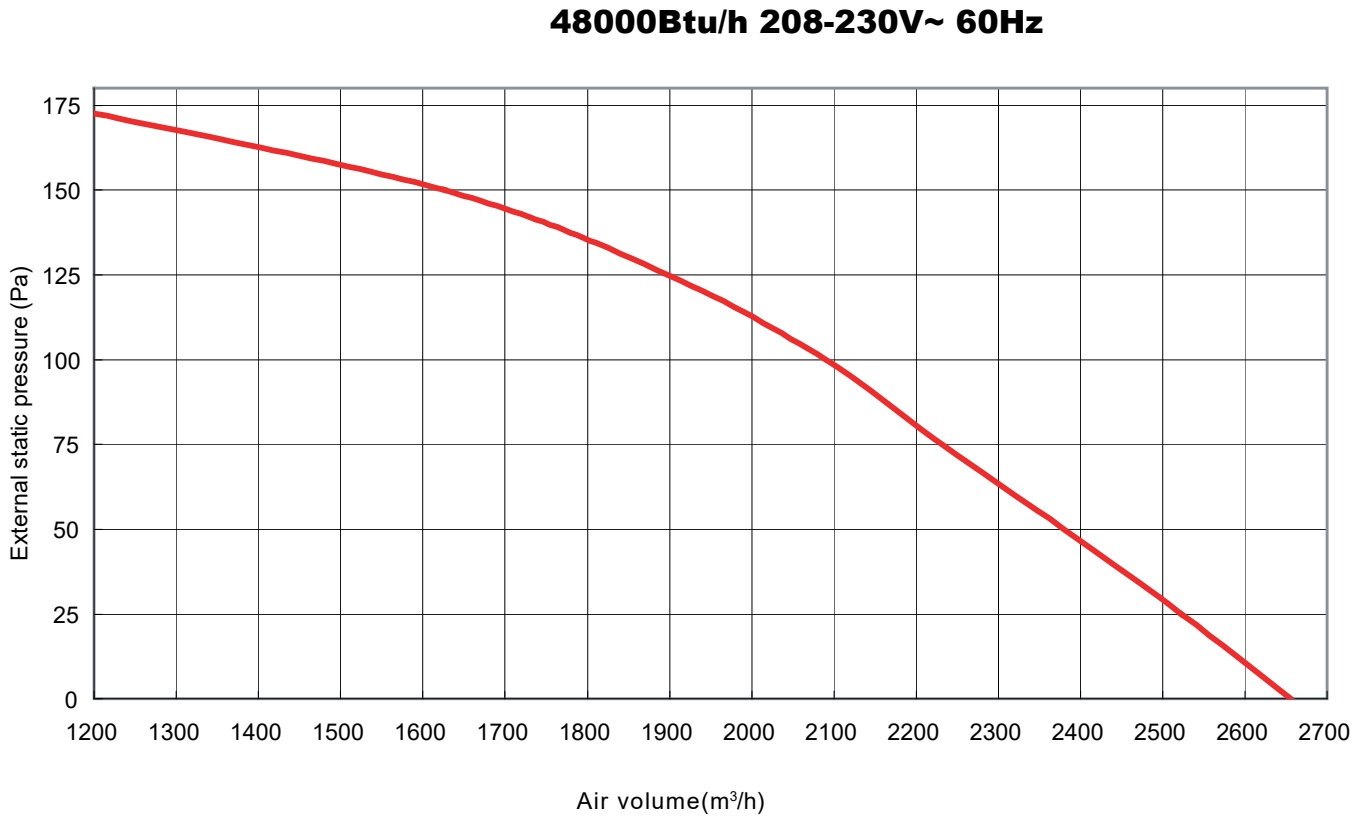


12.2 Model:4 ton

Parameter table for indoor unit air volume:

Static pressure (Pa)	0	25	50	75	100	125	150	175
Air flow (m3/h)	2651	2514	2290	2227	2295	1900	1620	1192
Brake power (W)	600	590	572	565	553	540	530	515
Fan speed (rpm)	1051	1060	1065	1072	1080	1091	1101	1120

Curve diagram of static pressure, air flow volume:

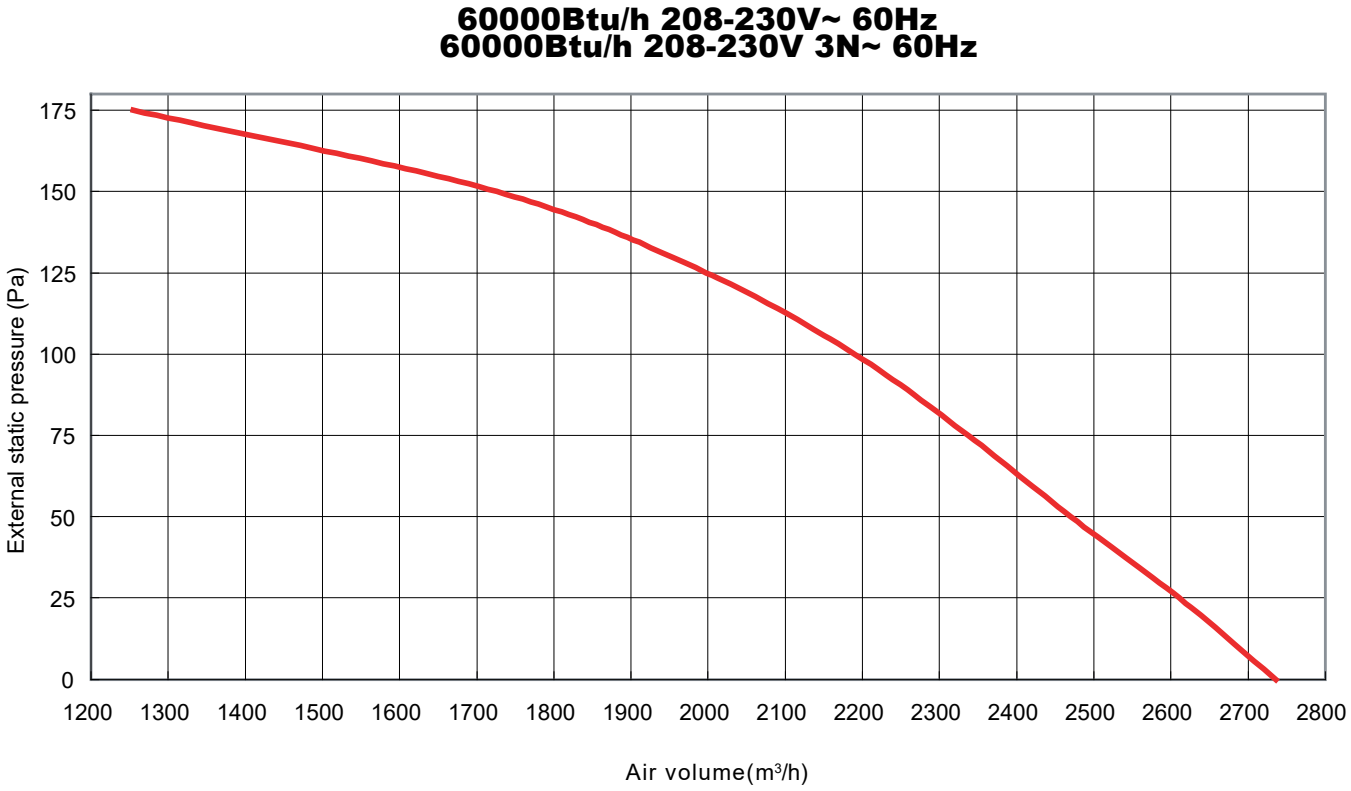


12.3 Model:5 ton

Parameter table for indoor unit air volume:

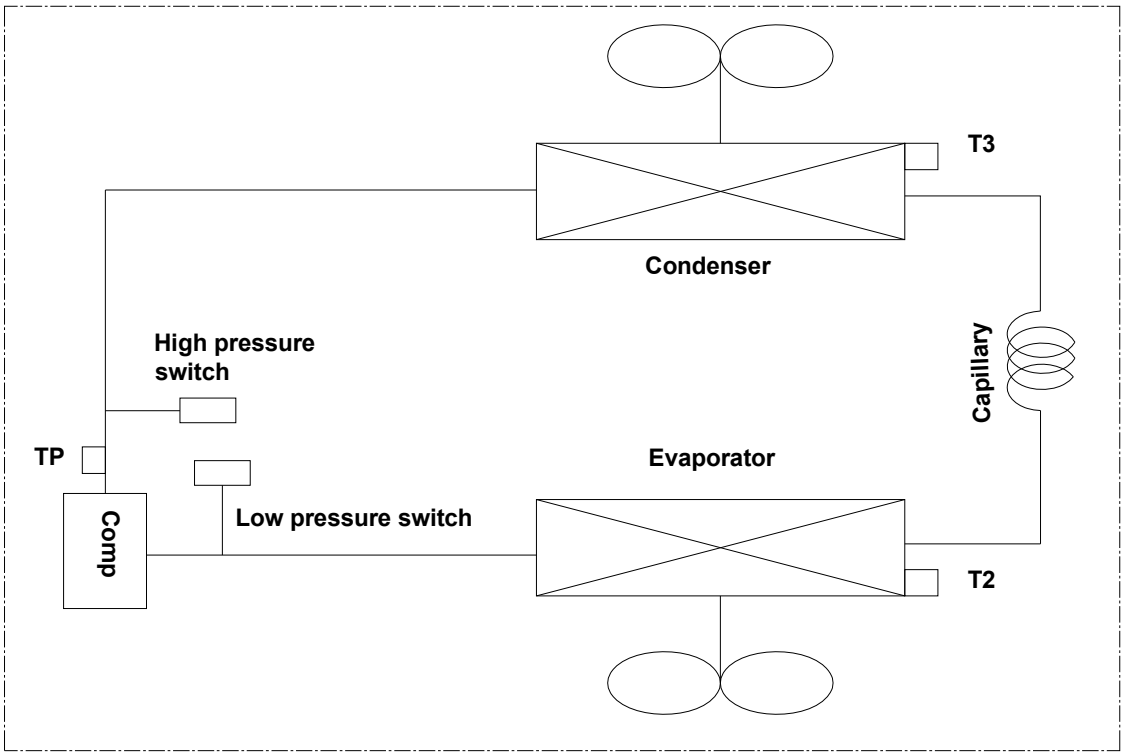
Static pressure (Pa)	0	25	50	75	100	125	150	175
Air flow (m3/h)	2726	2602	2460	2345	2191	2000	1703	1258
Brake power (W)	655	631	609	594	589	572	556	545
Fan speed (rpm)	1084	1092	1098	1102	1108	1115	1120	1127

Curve diagram of static pressure, air flow volume:



13. Refrigerant Cycle Diagram

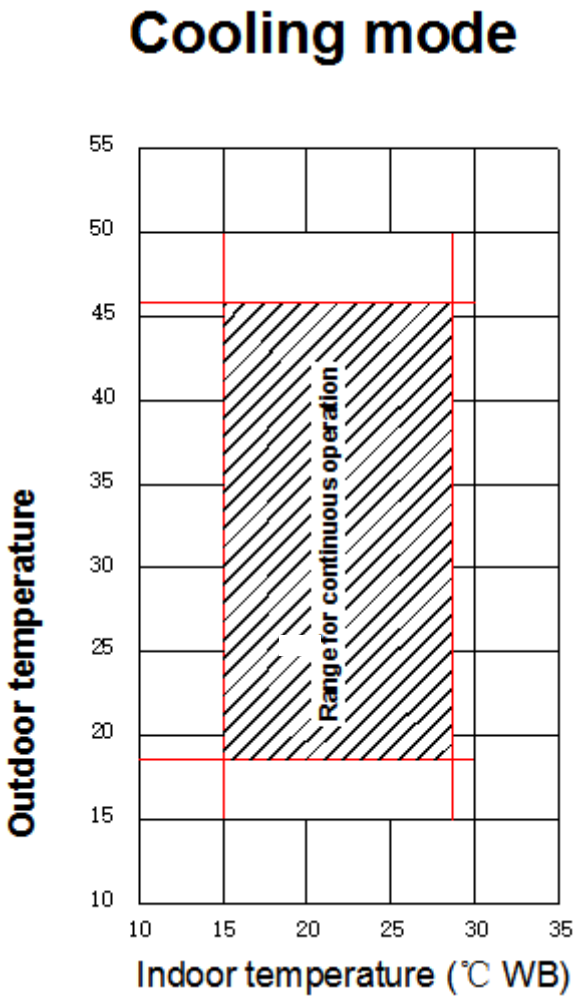
Cooling only



TP: Compressor discharge temperature sensor in system
T2: Indoor coil temperature sensor in system
T3: Outdoor coil temperature sensor in system

14. Operation Limit

14.1 Cooling only



Temperature / Model	Outdoor temperature	Indoor temperature
Cooling mode	64.4℉~114.8℉(18℃～46℃)	62.6℉~86(17℃～30℃)

Note:
Room relative humidity less than 80% . If the unit operates in excess of this figure, the surface of the unit may attract condensation.

15. Installation

15.1 Lifting

Rigging cables should have adequate capability to resist 3 times weight of unit. Before lift, please check and ensure that hooks are holding tightly to unit and lifting angles are no less than 60°.

Cloth material or hard-paper should be padded in the contact place between unit and rigging cable. Rigging cable should be entwined a round at the hook for preventing danger by cable slip because of weight unbalance.

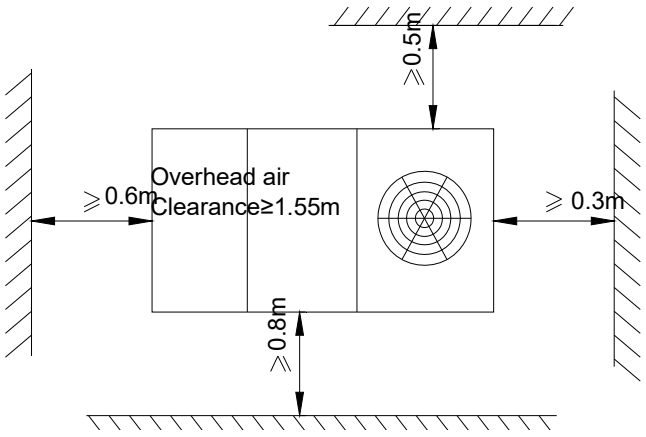
During lifting, anyone forbidden lingering under the lifting unit.

15.2 Service Space

1. The recommended clearances for single-unit installations are illustrated in following *Fig.*

These minimum requirements are not only an important consideration when determining unit placement, but they are also essential to ensure adequate serviceability, maximum capacity, and peak operating efficiency.

2. Any reduction of the unit clearances indicated in these illustrations may result in condenser coil starvation or the recirculation of warm condenser air. Actual clearances which appear to be inadequate should be reviewed with a local engineer.

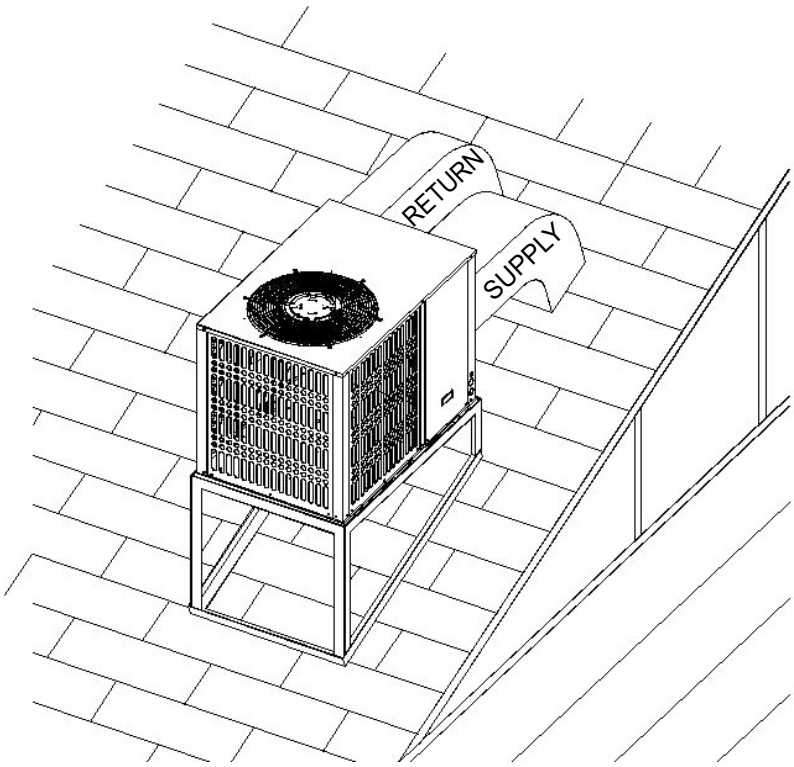


15.3 Rooftop -- units

For rooftop applications using a field fabricated frame and ducts, according to the following procedure:

1) The frame must be located and secured by bolting or welding to the roof. Flashing is required.
2) The hole in the roof must be prepared in advance of installing the unit.
3) Secure the ducts to the roof.
4) Place the unit on the frame or roof curb.
5) Secure the unit to the frame or roof curb.
6) Insulate any ductwork outside of the structure with at least two (2) inches of insulation and then weatherproof. There must be a weatherproof seal where the duct enters the structure.
7) Complete the installation according to the instructions.

Typical rooftop application with frame:



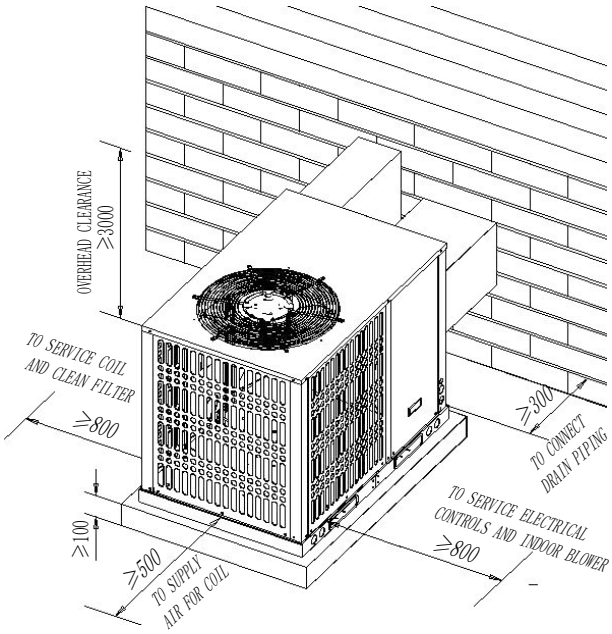
15.4 Ground Level -- Horizontal Units

For ground level installations, the unit should be positioned on a pad the size of the unit or larger. The unit must be level on the pad. The pad must not come in contact with the structure. Be sure the outdoor portion of the supply and return air ducts are as short as possible.

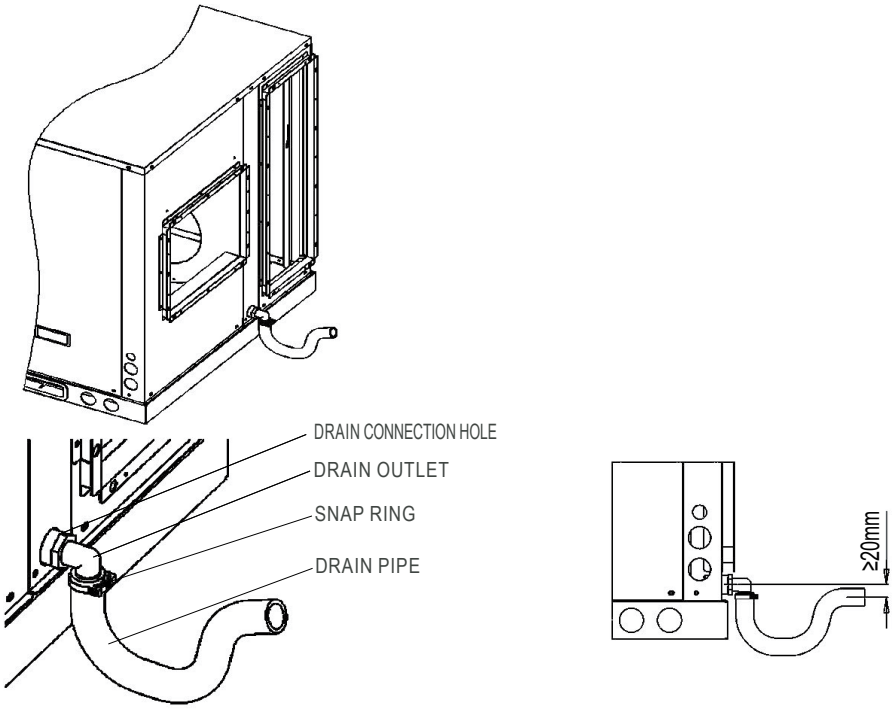
Installation according to the following procedure:

1) Place the unit on the pad.
2) Attach the supply and return air ducts to the unit.
3) Insulate any ductwork outside of the structure with at least 2 inches of insulation and weatherproof. There must be a weatherproof seal where the duct enters the structure.
4) Complete the installation according to the instructions.

Typical ground level application:



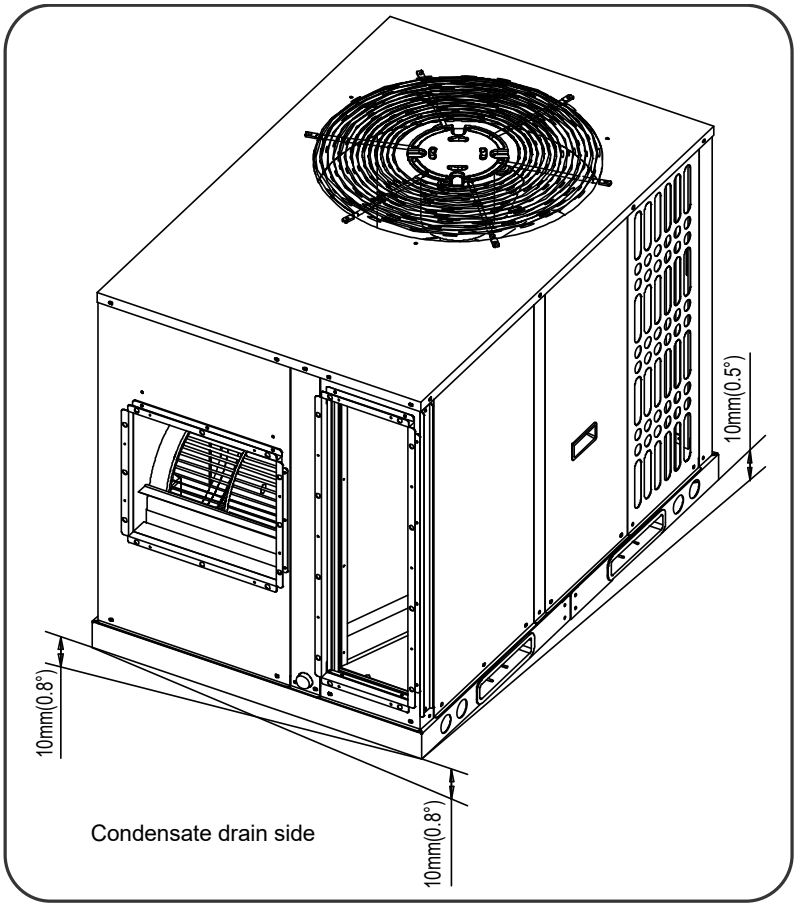
15.5 Installation of condensate drain piping



15.6 Maximum foundation gradient

Make sure the condensate drain side is not higher than the other side.

Typical maximum foundation gradient



15.7 Ductwork

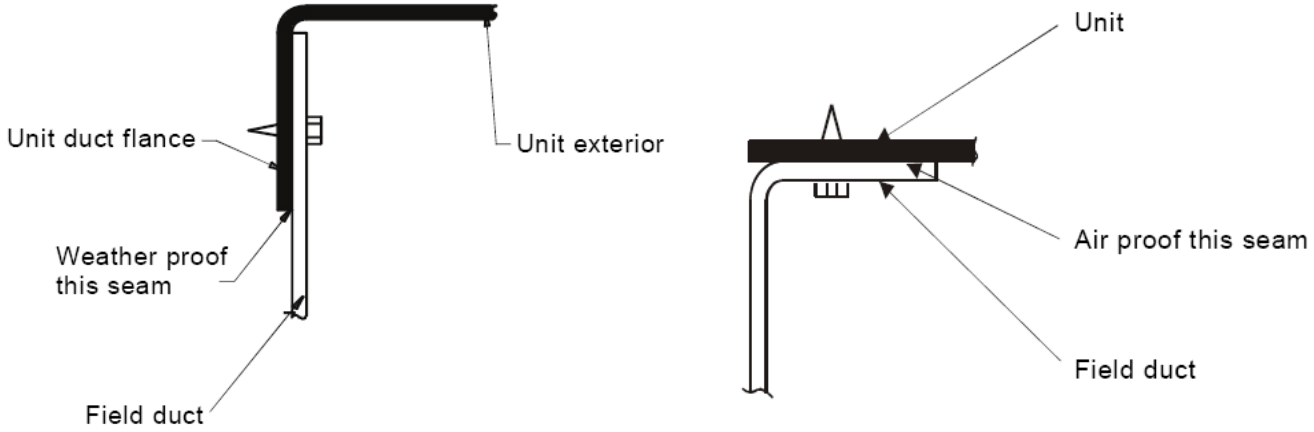
1. Attaching horizontal ductwork to unit

1) All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use a minimum of two (2) inches of insulation with a vapor barrier. The outside ductwork must be weatherproofed between the unit and the building.

2) When attaching ductwork to a horizontal unit, provide a flexible watertight connection to prevent noise transmission from the unit to the ducts. The flexible connection must be indoors and made out of heavy canvas.

Note:

Do not draw the canvas taut between the solid ducts.



2. Attaching down flow ductwork to roof curb

Supply and return air flanges are provided on the roof curb for easy duct installation. All ductwork must be run and attached to the curb before the unit is set into place.

Follow these guidelines for ductwork construction:

1) Connections to the unit should be made with three-inch canvas connectors to minimize noise and vibration transmission.

2) Elbows with turning vanes or splitters are recommended to minimize air noise and resistance.

3) The first elbow in the ductwork leaving the unit should be no closer than two feet from the unit, to minimize noise and resistance.

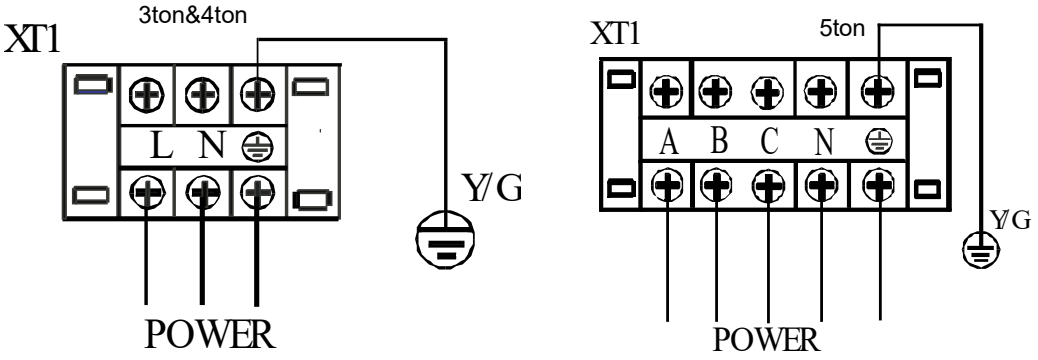
15.7 Wiring provision

Field wiring

The units are internally wired at the factory according to generally accepted electrical technology.

Required field wiring

Main power wiring to the unit control wiring between the control center and the unit, and earth wiring are required in the field.



Required components

The following components are required: main power fuse, conduit coupling, and field supplied room thermostat.

Wire and fuse size selection for main power source.

Wire and fuse size should be selected in accordance with national standard, taking the designed maximum current shall be the total of the compressor maximum current, condenser fan motor current and evaporator fan motor current (refer to “electrical data”).

Wire size between room thermostat and unit.

The wire size between the room thermostat and the unit should be determined according to the following table, because the 24V power source is applied to the control circuit.

	Wiring length between room thermostat and unit(one way)				
	10m	15m	20m	30m	40m
Minimum wire size(mm^2)	0.5	0.5	0.75	0.75	1.0

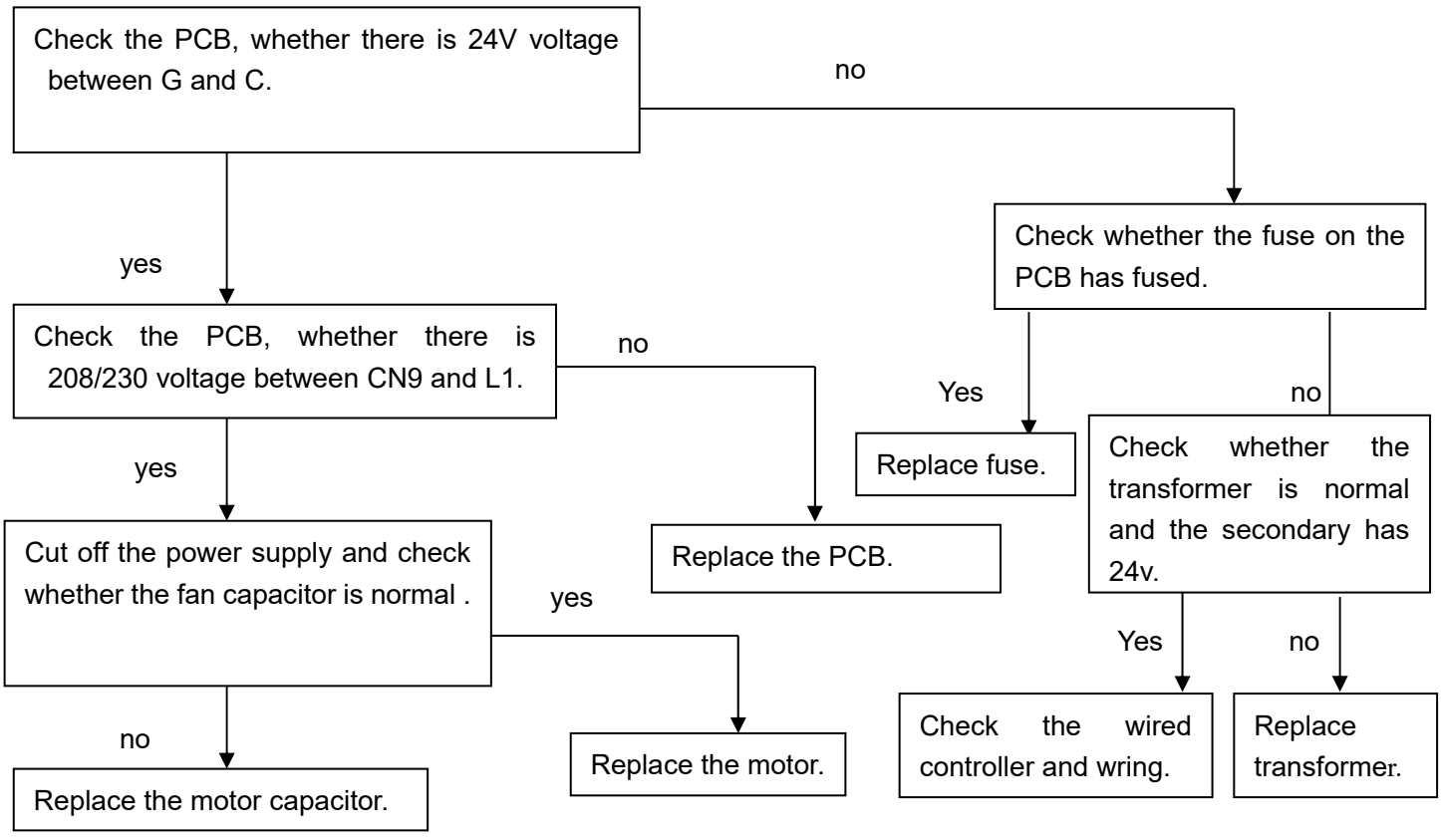
16. Error Code

No.	Code	LED1(Red)	LED2(Yellow)	LED3(Green)
1	Standby	OFF	OFF	ON
2	Function	ON	ON	ON
3	Lack of phase	Flash	Flash	Flash
4	Phase-error	Flash	Flash	OFF
5	T3 sensor failure	OFF	Flash	Flash
	High pressure protection			
	Vent protection			
6	T2 sensor failure	Flash	OFF	Flash
7	T2 Evaporator low temp, protection	OFF	Flash	OFF
8	T3 Condenser high temp, protection	Flash	OFF	OFF
9	Wired controller input failure	Flash	Flash	ON
10	Compressor current protection	OFF	OFF	Flash
11	Compressor-inhaling low pressure protection	Flash	ON	Flash

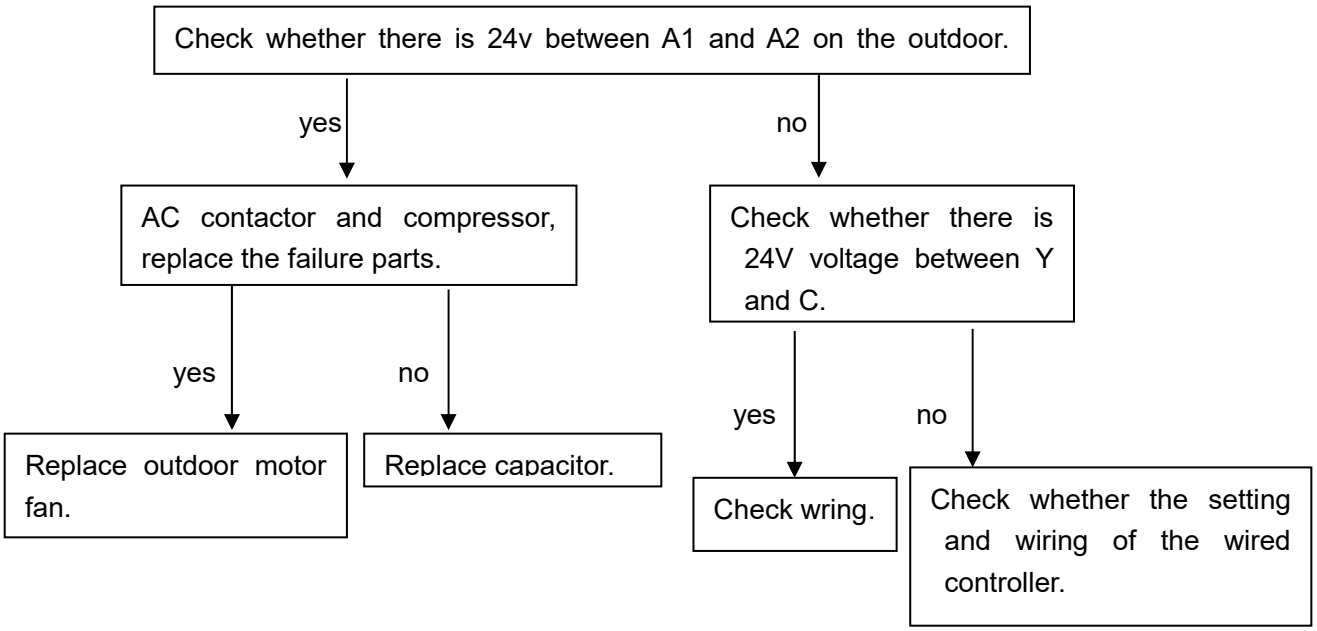
1. Indoor fan failure

Check whether the power supply is normal, each wired port is fastened , the setting and wiring of the wired controller is right.

Confirm the above and check as the following step.



2. Outdoor fan failure



17. Accessories

NAME OF ACCESSORIES	Q'ty	Qutime
MANUAL	1	—
DRAIN OUTLET	1	
SNAP RING	1	
DRAIN PIPE	1	

18. Maintenance and Upkeep

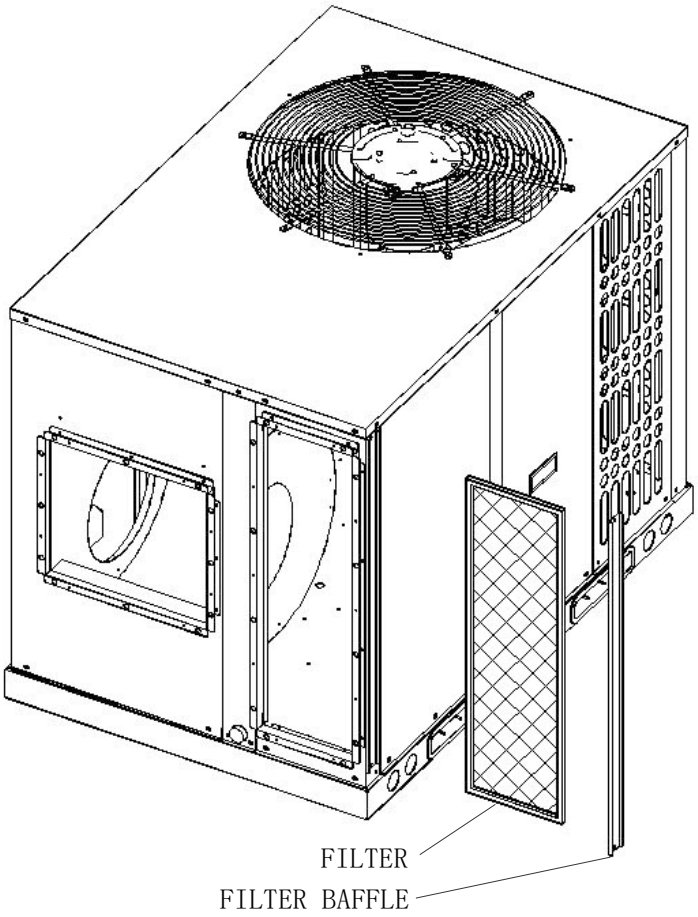
18.1 Routine maintenance by owner

You can do some of the periodic maintenance functions for your unit yourself, this includes cleaning the permanent air filters, cleaning the unit cabinet, cleaning the condenser coil, and conducting a general unit inspection on a regular basis.

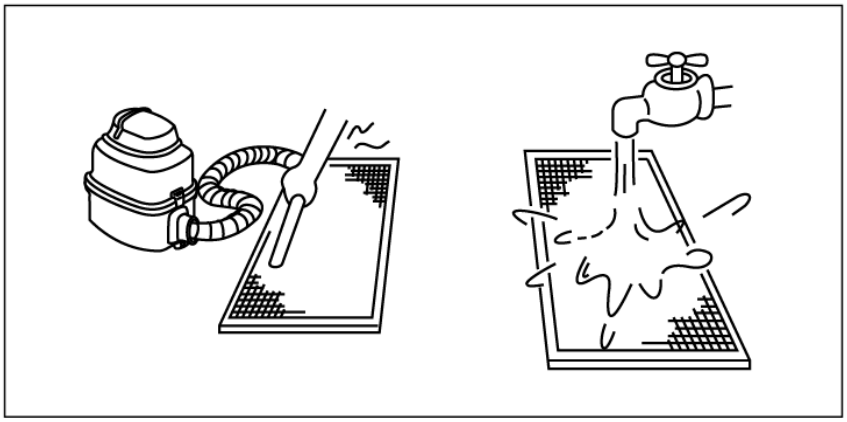
18.2 Clean the air filter

18.2.1 Dismantle the air filter

- Twist of screws, then the filter baffle gets out
- Drag out filter



18.3 Clean the air filter (Vacuum cleaner or pure water may be used to clean the air filter. If the dust accumulation is too heavy, please use soft brush and mild detergent to clean it and dry out.)



- The air-in side should face up when using vacuum cleaner.
- The air-in side should face down when using water.

CAUTION: Do not dry out the air filter under direct sunshine or with fire.

18.4 Re-install the air filter

Condenser coil

Unfiltered air circulates through the unit's condenser coil and can cause the coil's surface to become clogged with dust, dirt, etc. To clean the coil, vertically (i.e., with the fins) stroke the coil surface with a soft-bristled brush. Be sure to keep all vegetation away from the condenser coil area.

Maintenance performed by serviceman.

To keep your unit operating safely and efficiently, the manufacturer recommends that a qualified serviceman check the entire system at least once each year and any other time that you feel one is needed. Your serviceman should examine these areas of your unit:

Filters

Motors and drive system components

Economizer gaskets (for possible replacement)

Safety controls (for mechanical cleaning)

Electrical components and wiring (for possible replacement and connection tightness)

Condensate drain (for cleaning)

Unit duct connections (to see that they are physically sound and sealed to the unit casing)

Unit mounting support (for structural integrity)

The unit (for obvious unit deterioration)

CAUTION:

Do not operate the unit without the evaporator fan access panel in place. Reinstall the access panel after performing any maintenance. Operating the unit without the access panel may result in severe personal injury or death.

Appendix:

1. Indoor Temp. and Pipe Temp. Sensor Resistance Value Table

R - T Table

Part No. : NTSF0103FZ**

R25 = 10 KOhm ± 1%
B25/50 = 4100 K ± 1%

Temperature (℃)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (℃)	
-30	218.11	209.48	201.17	-0.60	0.62
-29	204.05	196.11	188.46	-0.59	0.62
-28	190.99	183.68	176.63	-0.59	0.61
-27	178.86	172.12	165.61	-0.58	0.60
-26	167.57	161.36	155.36	-0.58	0.60
-25	157.07	151.344	145.81	-0.57	0.59
-24	147.29	142.02	136.91	-0.57	0.59
-23	138.19	133.32	128.62	-0.56	0.58
-22	129.71	125.22	120.87	-0.55	0.57
-21	121.80	117.66	113.65	-0.55	0.57
-20	114.43	110.60	106.90	-0.54	0.56
-19	107.55	104.02	100.59	-0.54	0.56
-18	101.12	97.861	94.697	-0.53	0.55
-17	95.117	92.107	89.184	-0.52	0.54
-16	89.507	86.727	84.025	-0.52	0.54
-15	84.262	81.694	79.196	-0.51	0.53
-14	79.355	76.982	74.673	-0.50	0.52
-13	74.763	72.570	70.435	-0.50	0.52
-12	70.464	68.437	66.462	-0.49	0.51
-11	66.437	64.564	62.737	-0.48	0.50
-10	62.664	60.932	59.242	-0.48	0.50
-9	59.127	57.526	55.963	-0.47	0.49
-8	55.810	54.330	52.884	-0.46	0.48
-7	52.699	51.331	49.993	-0.46	0.47
-6	49.779	48.514	47.276	-0.45	0.47
-5	47.038	45.869	44.724	-0.44	0.46
-4	44.465	43.383	42.324	-0.44	0.45
-3	42.047	41.047	40.067	-0.43	0.45
-2	39.775	38.850	37.943	-0.42	0.44
-1	37.639	36.784	35.945	-0.41	0.43
0	35.630	34.840	34.064	-0.41	0.42
1	33.741	33.011	32.292	-0.40	0.42
2	31.963	31.288	30.624	-0.39	0.41
3	30.290	29.666	29.051	-0.38	0.40
4	28.714	28.137	27.569	-0.38	0.39
5	27.230	26.697	26.172	-0.37	0.39
6	25.831	25.339	24.853	-0.36	0.38
7	24.513	24.058	23.609	-0.36	0.37
8	23.270	22.850	22.435	-0.35	0.36
9	22.097	21.710	21.327	-0.34	0.36
10	20.991	20.633	20.279	-0.33	0.35

R - T Table

Part No. : NTSF0103FZ**

R25 = 10 KOhm ± 1%

B25/50 = 4100 K ± 1%

Temperature (℃)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (℃)	
11	19.947	19.617	19.290	-0.32	0.34
12	18.961	18.656	18.355	-0.32	0.33
13	18.030	17.749	17.471	-0.31	0.32
14	17.150	16.891	16.635	-0.30	0.32
15	16.318	16.080	15.844	-0.29	0.31
16	15.532	15.313	15.095	-0.29	0.30
17	14.788	14.587	14.386	-0.28	0.29
18	14.085	13.899	13.715	-0.27	0.28
19	13.419	13.249	13.079	-0.26	0.27
20	12.789	12.632	12.477	-0.25	0.27
21	12.191	12.048	11.906	-0.25	0.26
22	11.626	11.495	11.364	-0.24	0.25
23	11.090	10.970	10.850	-0.23	0.24
24	10.582	10.472	10.363	-0.22	0.23
25	10.100	10.000	9.9000	-0.21	0.22
26	9.6518	9.5519	9.4520	-0.22	0.23
27	9.2262	9.1265	9.0270	-0.23	0.25
28	8.8218	8.7226	8.6235	-0.25	0.26
29	8.4376	8.3389	8.2405	-0.26	0.27
30	8.0723	7.9743	7.8767	-0.27	0.28
31	7.7250	7.6279	7.5312	-0.28	0.29
32	7.3947	7.2985	7.2028	-0.29	0.31
33	7.0805	6.9853	6.8906	-0.30	0.32
34	6.7814	6.6873	6.5939	-0.32	0.33
35	6.4968	6.4038	6.3116	-0.33	0.34
36	6.2257	6.1340	6.0431	-0.34	0.35
37	5.9676	5.8772	5.7875	-0.35	0.37
38	5.7216	5.6326	5.5443	-0.36	0.38
39	5.4873	5.3996	5.3127	-0.38	0.39
40	5.2639	5.1776	5.0922	-0.39	0.40
41	5.0509	4.9660	4.8821	-0.40	0.42
42	4.8478	4.7644	4.6819	-0.41	0.43
43	4.6541	4.5721	4.4911	-0.43	0.44
44	4.4692	4.3887	4.3092	-0.44	0.45
45	4.2928	4.2137	4.1357	-0.45	0.47
46	4.1244	4.0468	3.9702	-0.46	0.48
47	3.9636	3.8874	3.8123	-0.48	0.49
48	3.8100	3.7353	3.6617	-0.49	0.51
49	3.6632	3.5900	3.5179	-0.50	0.52
50	3.5230	3.4512	3.3805	-0.52	0.53
51	3.3890	3.3186	3.2494	-0.53	0.55

R - T Table

Part No. : NTSF0103FZ**

R25 = 10 KOhm ± 1%

B25/50 = 4100 K ± 1%

Temperature (℃)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (℃)	
52	3.2608	3.1919	3.1241	-0.54	0.56
53	3.1383	3.0708	3.0044	-0.56	0.57
54	3.0211	2.9550	2.8900	-0.57	0.59
55	2.9090	2.8442	2.7806	-0.58	0.60
56	2.8017	2.7382	2.6760	-0.60	0.61
57	2.6990	2.6369	2.5759	-0.61	0.63
58	2.6006	2.5398	2.4802	-0.63	0.64
59	2.5064	2.4469	2.3886	-0.64	0.66
60	2.4162	2.3580	2.3009	-0.65	0.67
61	2.3298	2.2728	2.2170	-0.67	0.68
62	2.2470	2.1912	2.1366	-0.68	0.70
63	2.1676	2.1130	2.0596	-0.70	0.71
64	2.0914	2.0381	1.9858	-0.71	0.73
65	2.0184	1.9662	1.9151	-0.73	0.74
66	1.9484	1.8973	1.8474	-0.74	0.76
67	1.8812	1.8312	1.7824	-0.76	0.77
68	1.8167	1.7678	1.7201	-0.77	0.78
69	1.7548	1.7070	1.6603	-0.79	0.80
70	1.6954	1.6486	1.6029	-0.80	0.81
71	1.6383	1.5925	1.5479	-0.82	0.83
72	1.5834	1.5387	1.4951	-0.83	0.84
73	1.5308	1.4870	1.4443	-0.85	0.86
74	1.4801	1.4373	1.3956	-0.86	0.87
75	1.4315	1.3896	1.3488	-0.88	0.89
76	1.3847	1.3437	1.3038	-0.89	0.90
77	1.3397	1.2996	1.2606	-0.91	0.92
78	1.2964	1.2572	1.2191	-0.92	0.93
79	1.2547	1.2164	1.1791	-0.94	0.95
80	1.2146	1.1772	1.1407	-0.96	0.97
81	1.1761	1.1394	1.1038	-0.97	0.98
82	1.1389	1.1030	1.0682	-0.99	1.00
83	1.1031	1.0681	1.0340	-1.00	1.01
84	1.0687	1.0344	1.0011	-1.02	1.03
85	1.0355	1.0019	0.96936	-1.03	1.04
86	1.0035	0.97070	0.93884	-1.05	1.06
87	0.97272	0.94059	0.90943	-1.07	1.07
88	0.94302	0.91158	0.88111	-1.08	1.09
89	0.91438	0.88362	0.85382	-1.10	1.11
90	0.88676	0.85667	0.82751	-1.12	1.12
91	0.86012	0.83068	0.80216	-1.13	1.14
92	0.83442	0.80561	0.77772	-1.15	1.15

R - T Table

Part No. : NTSF0103FZ**

R25 = 10 KOhm ± 1%
B25/50 = 4100 K ± 1%

Temperature (℃)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (℃)	
93	0.80962	0.78143	0.75415	-1.17	1.17
94	0.78569	0.75811	0.73141	-1.18	1.19
95	0.76260	0.73560	0.70948	-1.20	1.20
96	0.74030	0.71387	0.68832	-1.22	1.22
97	0.71876	0.69290	0.66790	-1.23	1.23
98	0.69797	0.67266	0.64820	-1.25	1.25
99	0.67788	0.65310	0.62917	-1.27	1.27
100	0.65848	0.63422	0.61080	-1.28	1.28
101	0.63973	0.61598	0.59306	-1.30	1.30
102	0.62160	0.59836	0.57593	-1.32	1.32
103	0.60409	0.58133	0.55937	-1.34	1.33
104	0.58715	0.56487	0.54338	-1.35	1.35
105	0.57078	0.54896	0.52793	-1.37	1.37