

TCL

WALL MOUNTED SPLIT-TYPE AIR CONDITIONERS

SERVICE MANUAL

No.TE051220

Models

TAC-09CHSA/GI

TAC-12CHSA/GI



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IMPORTANT NOTICE

This service manual is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair the appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

The information, specifications and parameter are subject to change due to technical modification or improvement without any prior notice. The accurate specifications are presented on the nameplate label.

How to order spare parts

To have your order filled promptly and correctly, please furnish the following information:

1. Model No. with Indoor or Outdoor
2. No. in the Explosion View
3. Part Name
4. The quantity you ordered

Technical Specifications

Model No.		TAC-09CHSA/GI	TAC-12CHSA/GI		
Type		heating pump	heating pump		
Control type		remote	remote		
Rated cooling capacity	Btu/h	9,000(3,800~10,500)	12,000(5,200~13,500)		
Rated heating capacity	Btu/h	10,250(4,200~13,000)	13,800(5,500~16,500)		
Moisture removal		Liters/h			
Indoor noise level at cooling	High	dB(A)	37	38	
	Med.	dB(A)			
	Low	dB(A)			
Outdoor noise level		dB(A)	52	55	
Electrical Data					
Power supply		220-240V~/50Hz			
Voltage Range		V	158-260	158-260	
Rated current	Cooling	A	3.6	4.9	
	Heating	A	3.8	5.2	
Rated input	Cooling	W	780	1060	
	Heating	W	820	1120	
Refrigerating System					
Refrigerant/Charge		Gram	410A / 780g	410A / 1080g	
Compressor	Type	Rotary		Rotary	
	Model	DA108X1C-20FZ3		DA108X1C-20FZ3	
	LRA	A			
	MFG	Toshiba		Toshiba	
Evaporator		Louver fin and Grooved tube type (φ7)			
Condenser		Corrugated fin and Grooved tube type (φ9.53)			
Expansion device		Capillary tube			
Defrosting system		Microcomputer controlled reverse system			
Fan System					
Indoor air circulation/Hi Cooling		m ³ /h	450	480	
Indoor fan type		Cross Flow		Cross Flow	
Indoor fan speed H/M/L	Cooling	rpm	1300/1280/1100/950	1330/1300/1150/1000	
	Heating	rpm	1300/1280/1100/900	1320/1300/1100/900	
	Dry	rpm	950	1150	
	Sleep	rpm	950/900	1000/900	
Outdoor fan type		Propeller fan		Propeller fan	
Outdoor fan speed		rpm	850	850	
Connections					
Refrigerant coupling					
Connecting Pipe	Gas	Inches	3/8"	1/2"	
	Liquid	Inches	1/4"	1/4"	
Connecting Wiring		Size x Core number	4×1.5	4×1.5	
Drainage Pipe		O.D.16mm			
Others					
Suitable area		m ²	9-15	12-19	
Net dimensions		Indoor	mm	770*240*180	770*240*180
(W x H x D)		Outdoor	mm	760*560*260	760*560*260
Net weight	Indoor	kg	8.5	8.5	
	Outdoor	kg	30	34	
Packing dimensions		Indoor	mm	883*325*271	883*325*273
(W x H x D)		Outdoor	mm	863*598*381	863*598*383
Gross weight	Indoor	kg	10.5	10.5	
	Outdoor	kg	33	37	
low temp. start-up		°C	-15	-15	
high temp. start-up		°C	52	52	

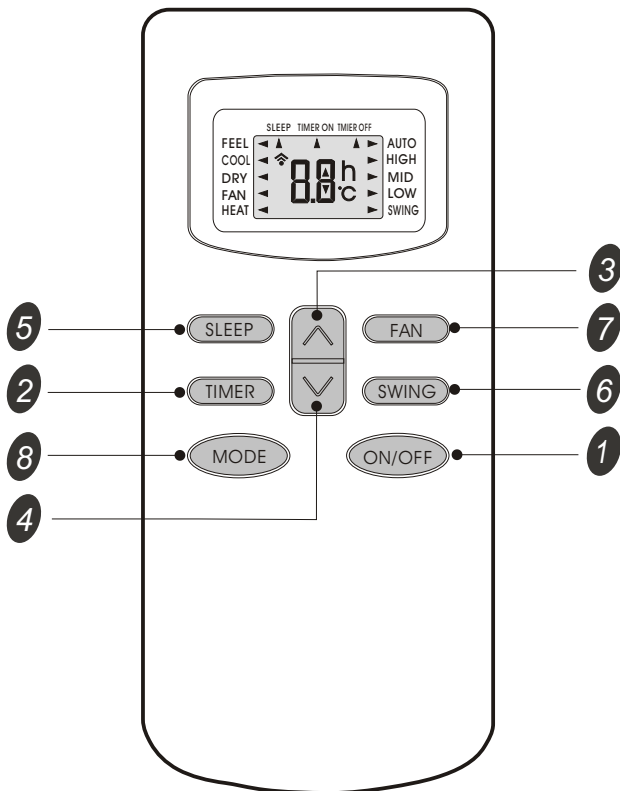
Note: The technical specifications is only reference.

Operation Details

Remote controller

Remote controller

The remote controller transmits signals to the system.



- 1 ON/OFF button**
Used to start and stop operation when pressed.
- 2 TIMER button**
Used to select TIMER operation.
- 3 UP button (TOO COOL button)**
Used to increase the set room temperature and time.
- 4 DOWN button (TOO WARM button)**
Used to decrease the set room temperature and time.
- 5 SLEEP button**
Used to set or cancel sleep mode operation.
- 6 VANE control button**
Used to adjust airflow direction.
- 7 FAN SPEED control button**
Used to select the indoor fan motor speed: Auto, High, Mid and Low.
- 8 MODE button**
Used to select the type of operation mode: Feel, Cooling, Dry, Fan and Heating(Only for Heat Pump).

Note: Each mode and relevant function will be further specified in following pages.

Remote Control

The remote controller is not preset as Cooling Only Air Conditioner or Heat Pump by manufacturer. Each time after the remote controller replace batteries or is energized, the arrowhead will flashes on the front of "Heat" or "Cool" on LCD of the remote controller. User can preset the remote controller type depending on the air conditioner type you have purchased as follows:
 Press any button when the arrowhead flashes on the front of "Cool", Cooling Only is set.
 Press any button when the arrowhead flashes on the front of "Heat", Heat Pump is set.
 If you don't press any button within 10 seconds, the remote controller is preset as Heat Pump automatically.

Note :

If the air conditioner you purchased is a Cooling Only one, but you preset the remote controller as Heat Pump, it doesn't bring any matter. But if the air conditioner you purchased is a Heat Pump one, and you preset the remote controller as Cooling Only, then you CAN NOT preset the Heating operation with the remote controller.

Electronic Controller

1. Safety Protection

(1) Time Delay for Safety protection

- 3 minutes delay for compressor ---The compressor is ceased for 3minutes before restarting to balance the pressure in the refrigeration cycle in order to protect the compressor.
- 2 minutes delay for 4-way valve---The 4-way valve will be ceased for 2 minutes late after compressor to prevent the refrigerant-gas abnormal noise when the HEATING operation is OFF or switch to the other operation mode.

(2) Discharge temperature protection

There is a temperature sensor on top of compressor, when temperature on top of compressor exceeded the limit, system control will shut down the compressor and the display board will show the error code.

(3) lower voltage protection

When AC voltage $\leq 158V$ and keep it for 10 seconds, unit will be shut down for protection.

(4) Over voltage protection

When AC voltage $\geq 260V$, unit will be shut down and recover while $AC \leq 255V$.

(5) Over current protection

When the current of outdoor unit is overload, controller shut down the unit immediately and show error code.

(6) Compressor abnormality protection

When compressor start on or in the process of running, if there is no feedback to controller or load of compressor is abnormality, the air conditioner will shut down, and show error code.

(7) IPM module protection

IPM module has high temperature & over current protection itself, if there is signal feedback to IPM, the outdoor unit will shut down, LED on outdoor PCB will show the error code.

2. "I Feel" Mode Operation

(1) When the "I Feel" mode is selected, the operation mode and initial temperature set are determined by the initial room temperature at start-up of the operation except to turn off the air conditioner and operates it again.

(2) If the mode is change to "I Feel" from other mode, the "I Feel" mode doesn't operate until compressor stop for more than 3 minutes.

Mode	Initial Room Temperature	Initial Set Temperature
COOLING	$RT \geq 26^{\circ}C$	$23^{\circ}C$
DRY	$26^{\circ}C > RT \geq 20^{\circ}C$	$RT - 2^{\circ}C$
HEATING for Heat Pump FAN for Cooling Only	$RT < 20^{\circ}C$	-

- In the "I Feel" mode, when the controller receives the up or down signal of temperature, the set temperature can adjust by $1^{\circ}C$ upper or lower. The biggest you can adjust by $2^{\circ}C$ upper or lower.

3. "COOLING" Mode Operation

(1) Compressor frequency control

According to difference room temperature and set temperature ($\delta t = RT-ST$), running frequency of compressor is controlled by electronic controller. When room temperature is much higher than set temperature, compressor will start at a high frequency, and as room temperature goes down, compressor running frequency will go down. When room temperature is lower than set temperature, compressor will run at very low frequency. In general, unit will change its running frequency according to δt to make room temperature closing to set temperature.

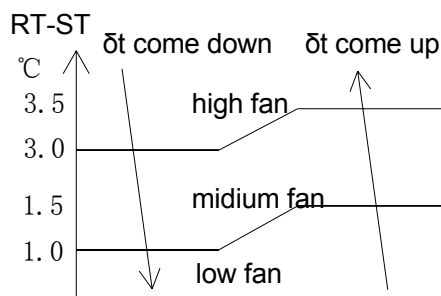
(2) Outdoor temperature affects running frequency of compressor

Outdoor temperature affect compressor's running frequency. Difference inlet temperature of outdoor unit is adapted by difference compressor running frequency. While outdoor temperature is about 30°C , the compressor will run in high frequency.

If unit run in "cooling" mode and outdoor temperature is less than -1°C , controller will shut down compressor and show error code, while the ambient temperature is over 0°C , the compressor will run automatically.

(3) Auto fan control in cooling mode

In cooling mode (include cooling in "I feel" mode), fan speed is determined by δt , as the following diagram:



4. "DRY" Mode Operation

- (1) The system for DRY operation used the same refrigerant circle as the cooling one.
- (2) When the system operates in DRY mode, at first it operates in cooling mode at 16°C or 18°C for 3 minutes. After that, the system will operate in cooling mode with lowest fan speed, meanwhile the set temperature (ST) is "RT-2°C" which means that the ST is room temperature at then minus 2. During the course of this mode, the fan speed set operation and room temperature set are restricted, except the vane motor adjusting.

5. "HEATING" Mode Operation (available for Heat Pump only)

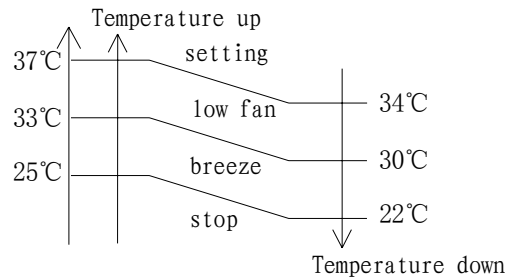
(1) Frequency control

The same as the frequency control in cooling mode, running frequency of compressor is controlled by controller. Unit change its running frequency according to δt to make room temperature closing to the set temperature.

(2) Indoor fan motor control

1. Cold Air Prevention Control

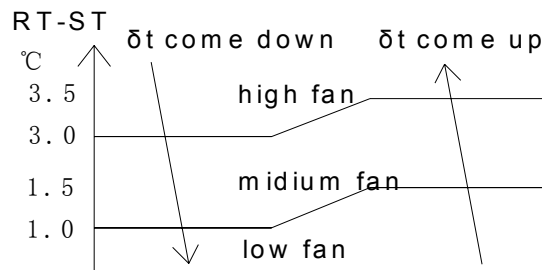
- The function is intended to prevent cold air from being discharged when the heating operation starts or when defrosting.
- The indoor fan speed will be controlled as following.



- In the heating operation, if the air conditioner is turned off, the indoor fan motor will run most for 30 seconds since the stop of compressor.

2. Auto fan control (heating)

In heating mode(include in "I feel" mode) , fan speed is determined by δt , as the following:



(3) 4-way valve control

In heating mode, 4-way valve will power on ahead of compressor for 5 seconds, and cut off for 2 minutes later than compressor's stop. 4-way valve will not power off unless the machine is switched off, mode changed or on the process of defrosting.

(4) Defrosting

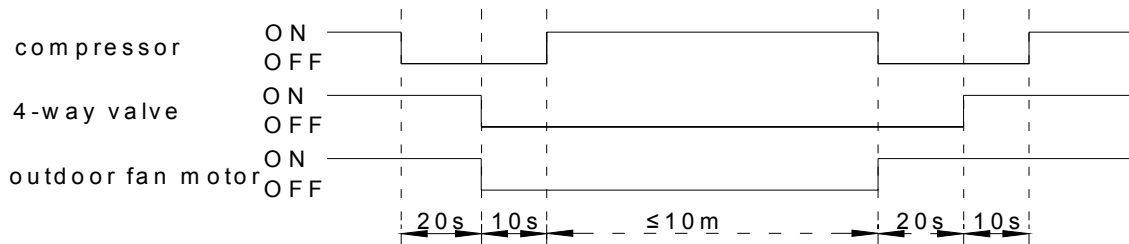
Defrosting is controlled by the microprocessor.

When one of the following conditions is satisfied, unit will come into defrosting:

- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C while the unit runs for more than 40 minutes, and OPT is keeping under -6°C for more than 3 minutes.
- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C meanwhile the unit runs for more than 80 minutes, and OPT is keeping under -4°C for more than 3 minutes.
- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C while the unit runs for more than 120 minutes, and OPT is keeping below -2°C for more than 3 minutes.

Before the air con come into defrosting, compressor running frequency drop down to a lower frequency firstly, then the compressor shuts down.

In defrosting, the max. frequency of compressor is F9 (a little less than the highest frequency). In this period all protection function are available.



In defrosting, LED showing by winking.

Come into or out of defrosting, indoor fan motor speed is the same as Cold Air Prevention Control.

One of the following conditions is satisfied, unit come out of defrosting and shift to heating mode:

- a. Outdoor coil Temperature (OPT) $\geq 15^{\circ}\text{C}$
- b. Defrost time keep time for more than 10 minutes.

(5) Indoor exchanger overheat protection

When Indoor exchanger Temperature(IPT) is higher than 55°C , unit come into indoor exchanger overheat protection. Compressor drop its frequency toward to F1 level until $\text{IPT} \leq 52^{\circ}\text{C}$; If $\text{IPT} \leq 52^{\circ}\text{C}$ and keep for 5 minutes, control system don't limit running frequency.

If $\text{IPT} > 62^{\circ}\text{C}$, control system shut down compressor, and recover when IPT drop less than 50°C .

6. "SLEEP" mode

When the SLEEP button is pressed, the SLEEP mode is selected as following:

- The indoor fan speed is set at low speed, the power lamp and the sleep lamp is on, the display of temperature will be close after 5 minutes.
- When selecting COOLING/DRY operation with SLEEP mode, the set temperature will be raised by 1°C 1 hour later and by 2°C 2 hour later.
- When selecting HEATING operation with SLEEP mode, the set temperature will be dropped by 1°C 1 hour later and 2°C 2hour later.
- After the System operates in SLEEP mode for 8 hours, it will stop automatically.

7. EMERGENCY Operation

When the EMERGENCY Operation switch is pressed once, COOLING mode is selected and if in 3 seconds the EMERGENCY Operation switch is pressed again, mode is selected. Then pressed once again, the unit is switch off.

When the remote controller is missing, has failed or the batteries run down, press the EMERGENCY Operation switch on the front of the indoor unit. The unit will start.

The first 30 minutes of operation will be the test run operation. The operation is for servicing. The indoor fan runs at high speed and the system is in continuous operation. The thermostat is ON and the timer is reset to normal.

After 30 minutes of test run operation the system shifts to AUTO COOLING/HEATING mode, and the indoor fan runs in automatic speed. The operation continues unit the EMERGENCY operation switch is pressed or a button on the remote controller is pressed, the normal operation will start.

NOTE: Do not press the EMERGENCY Operation switch during normal operation.

8. AUTO-RESTART Function (Option)

1. When air conditioner is operating in one mode, all of its operation data, such as working mode and temperature of setup would be memorized into IC by main PCB. If power cuts due to

some reason, when power supply come back again, the AUTO-RESTART function will set synchronously and automatically to work. So the air conditioner would work at the same mode before.

Auto-restart Pre-setting (optional):

If Auto-restart function is needed, follow the steps below to activate this function:

- 1) Pulling the air-con's plug out of socket.
- 2) Pressing and holding the Emergency button (ON/OFF) on the indoor, then insert the plug into the socket again.
- 3) Keep pressing the Emergency button for more than 10 seconds until three short beeps are heard. The **Auto-restart** function has been started.

9. Protection and Failure Display

- When protection display is available, controller will show error code, digital LED shows error code and setting temperature by turns.
- If there is more than one failure, it will show at first that in front of the error list.
- Protection display function can be selected in hardware, and the default don't display;
- To insure of in and out communist is credibility, the failures relate to outdoor unit will remain failure state for 2 minutes max after recovered.
- In all failures, only sensor failures don't have to repower to cancel.

● **Error list**

Failure type	LED CODE	DIGITAL LED CODE
In and out communication failure	RUN、TIMER –both winking	E0
Outdoor communication failure	RUN、TIMER –both winking	EC
Outdoor sensor	RUN-1 time/8s	E1
Indoor coil temperature sensor	RUN-2 times /8s	E2
Outdoor coil temperature sensor	RUN-3 times /8s	E3
System abnormity	RUN-4 times /8s	E4
Type mismatch	RUN-5 times /8s	E5
Indoor fan motor	RUN-6 times /8s	E6
Outdoor temperature sensor	RUN-7 times /8s	E7
Discharge temperature sensor	RUN-8 times /8s	E8
Invert module abnormity	RUN-9 times /8s	E9
Outdoor fan motor (DC)	RUN-10 times /8s	EF
Current sensor	RUN— 11 times /8s	EA
EEPROM failure	RUN-12 times /8s	EE
Top of compressor temperature switch	RUN-13 times /8s	EP
Voltage sensor	RUN-14 times /8s	EU

Protection display code list:

Protection type	LED CODE	DIGITAL LED CODE
higher or lower voltage	RUN-winking,TIMER-1 time/8s	P1
Over current	RUN- winking,TIMER-2 times /8s	P2
Discharge temperature	RUN- winking,TIMER-4 times /8s	P4
Over cooling in cooling mode	RUN-light,TIMER-5 times /8s	P5
Over heating in cooling mode	RUN- light,TIMER-6 times /8s	P6
Over heating in heating mode	RUN- light,TIMER-7 times /8s	P7
Outdoor temperature too high or low	RUN- light,TIMER-8 times /8s	P8
Drive protection(Overload)	RUN- winking,TIMER-9 times/8s	P9
Module self protection	RUN- winking,TIMER-10 times/8s	P0

- Outdoor failure display

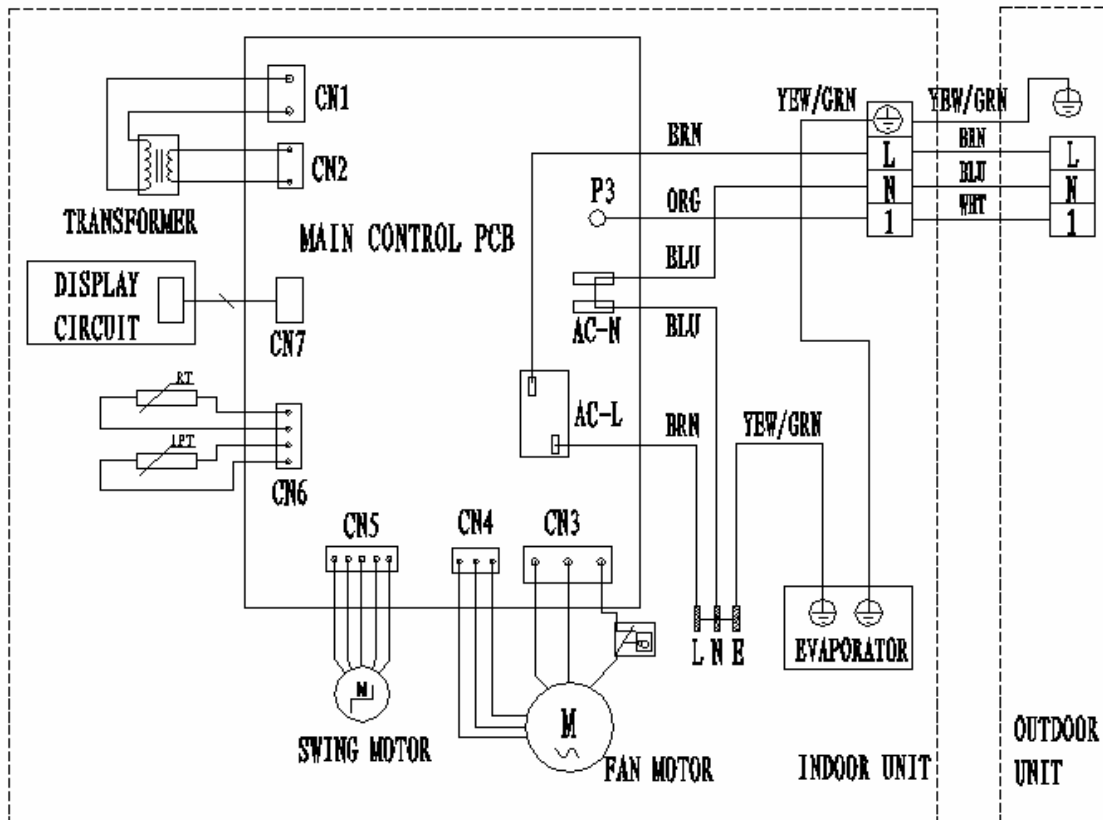
There is a LED on outdoor power board, when compressor is running; it is normally light; when no feedback of signal to power board from compressor, it will wink by lighting 1s and going out 1s. If failures happened, it will light 0.5s, go out 0.5s, winking several times and go out 3s for a cycle to indicate failures. The failure list is the follow:

Wink time	Failure
1	IPM protection
2	higher or lower voltage
3	Over current
4	Discharge temperature too high
5	Outdoor coil temperature too high
6	Drive abnormality
7	Communication abnormality with indoor unit
8	Compressor over heat (switch on top of compressor)
9	Outdoor air temperature sensor failure
10	Outdoor coil temperature sensor failure
11	Outdoor discharge pipe temperature sensor failure
12	Voltage sensor failure
13	Current sensor failure
14	IPM abnormality
15	Outdoor communication abnormality
16	DC fan motor no feedback
17	defrosting

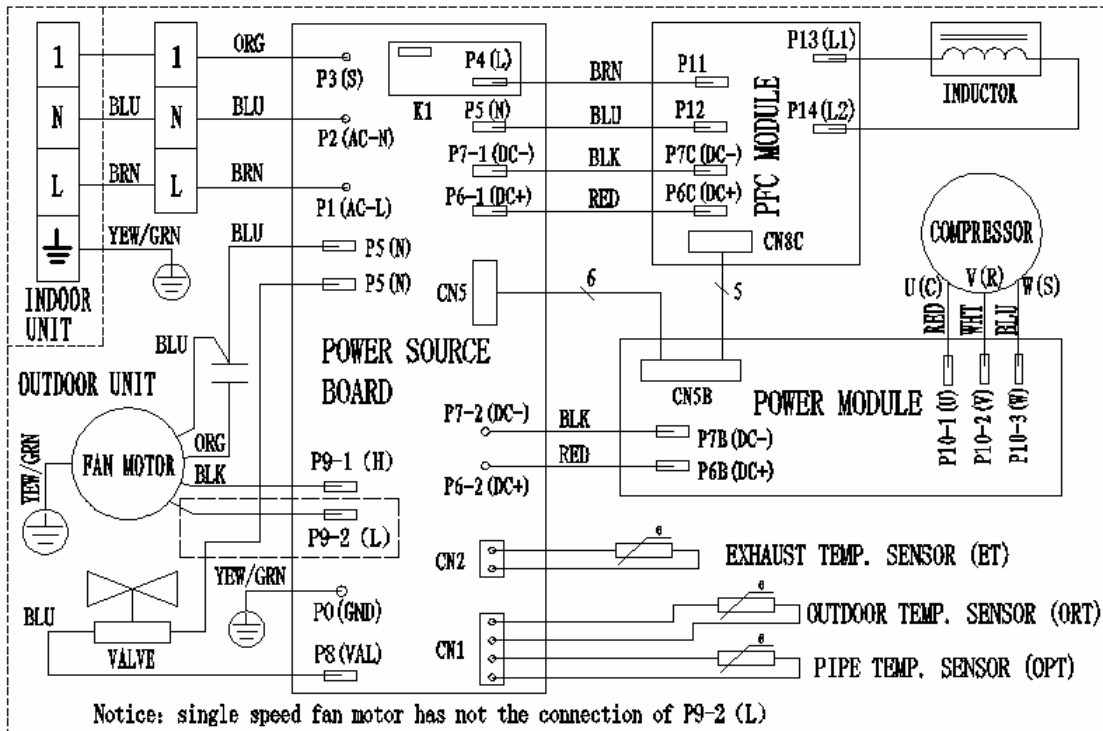
Wiring diagram

Model: TAC-09CHSA/GI, TAC-12CHSA/GI

Indoor unit:



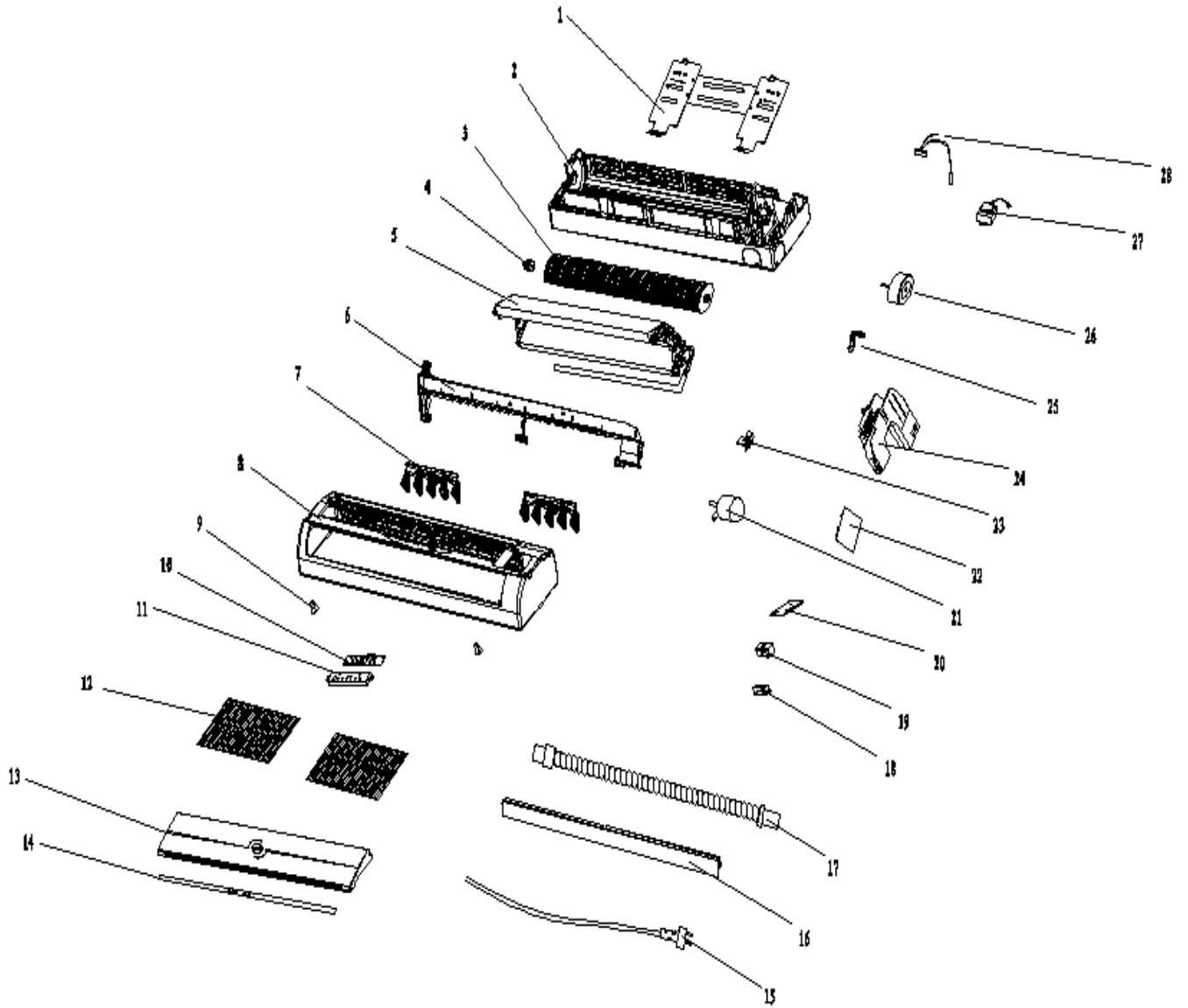
Outdoor Unit:



EXPLOSION VIEW

Indoor unit

Model: TAC-09CHSA/GI, TAC-12CHSA/GI



PART LIST

Indoor unit

Model: TAC-09CHSA/GI

No.	Part No.	Part Name	Q'ty	Remark
1	1080030008	Installation plate	1	
2	1210320107	Base	1	
3	1070020016	indoor fan	1	
4	1070100010	Bearing Mount	1	
5	1110050067	Evaporator	1	
6	1070320103	Water Drainage Assembly	1	
7	1070320105	Vertical Vane Assembly	2	
8	1070320121	Face frame	1	
9	1070320112	Screw cover	2	
10	1090251109	Display PCB	1	
11	1070320115	Display PCB box	1	
12	1070320109	Air filter	2	
13	1070321113	panel	1	
14	1070321107	Ornament strip	1	
15	1170120045	Power supply cord	1	
16	1070320104	vane	1	
17	1070110008	Drainage hose	1	
18	1070040004	Cable clamp	1	
19	1170200042	Terminal	1	
20	1070250109	Terminal fixing board	1	
21	1170020011	vane motor	1	
22	1090320163	Control PCB	1	
23	1073030201	Sensor holder	1	
24	1070320113	Electrical box	1	
25	1070320111	Indoor motor cover	1	
26	1170030067	Indoor motor	1	
27	1170240001	transformer	1	
28	1170230001	Temperature sensor assembly	1	
29	1090010071	Remote controller	1	Not shown in explosion view
30	1073030303	Remote controller supporter	1	
31	1190060008	Left foaming	1	
32	1190060009	Right foaming	1	

PART LIST

Indoor unit

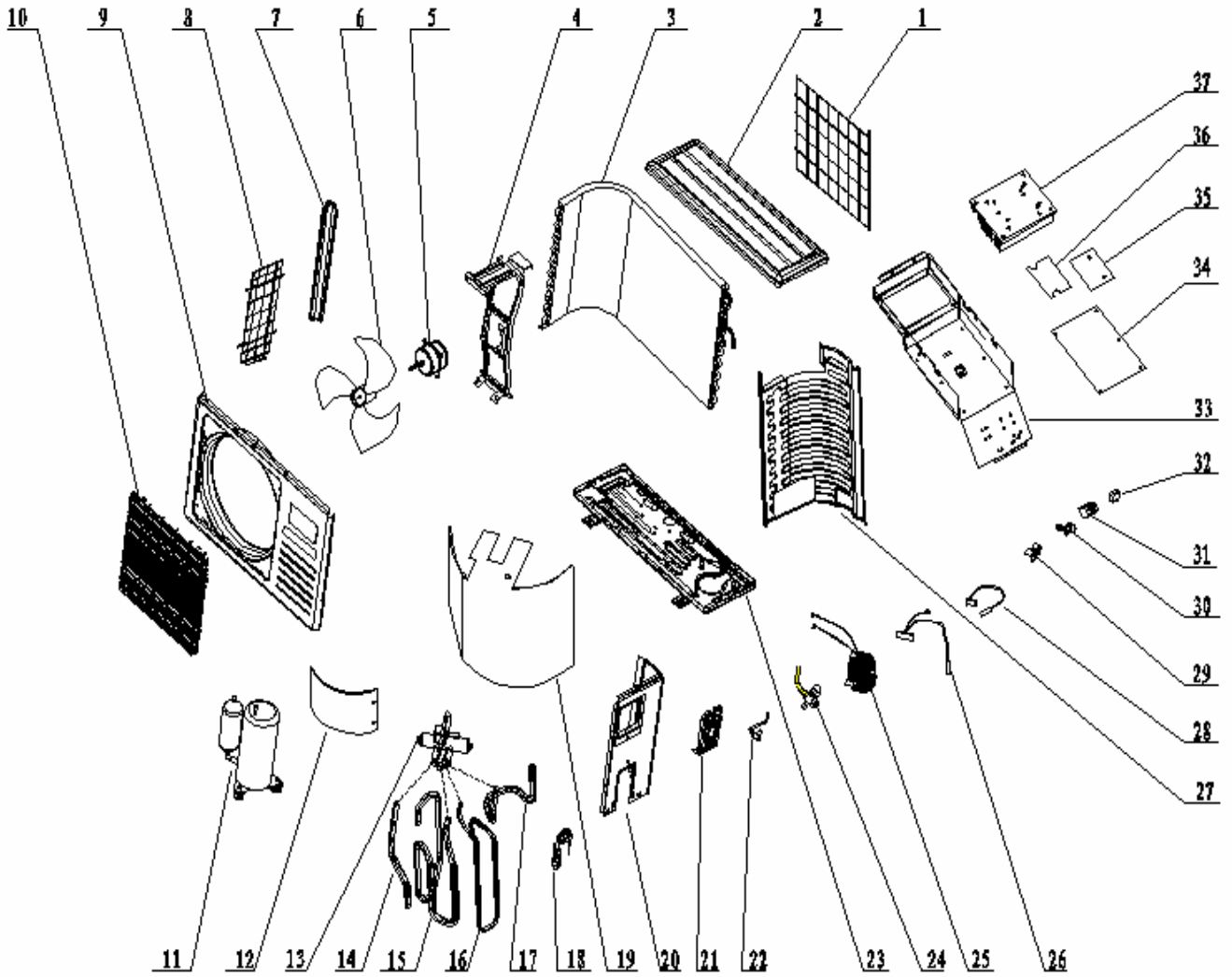
Model: TAC-12CHSA/GI

No.	Part No.	Part Name	Q'ty	Remark
1	1080030008	Installation plate	1	
2	1210320107	Base	1	
3	1070020016	Cross fan	1	
4	1070100010	Bearing Mount	1	
5	1110050068	Evaporator	1	
6	1070320103	Water Drainage Assembly	1	
7	1070320105	Vertical Vane Assembly	2	
8	1070320121	Face frame	1	
9	1070320112	Screw cover	2	
10	1090251109	Display PCB	1	
11	1070320115	Display PCB box	1	
12	1070320109	Air filter	2	
13	1070321113	panel	1	
14	1070321107	Ornament strip	1	
15	1170120045	Power supply cord	1	
16	1070320104	vane	1	
17	1070110008	Drainage hose	1	
18	1070040004	Cable clamp	1	
19	1170200042	Terminal	1	
20	1070250109	Terminal fixing board	1	
21	1170020011	Vane motor	1	
22	1090320163	Main PCB	1	
23	1073030201	Sensor holder	1	
24	1070320113	Electrical box	1	
25	1070320111	Indoor motor cover	1	
26	1170030067	Indoor motor	1	
27	1170240001	transformer	1	
28	1170230001	Temperature sensor assembly	1	
29	1090010071	Remote controller	1	Not shown in explosion view
30	1073030303	Remote controller supporter	1	
31	1190060008	Left foaming	1	
32	1190060009	Right foaming	1	

EXPLOSION VIEW

Outdoor unit

Model: TAC-09CHSA/GI, TAC-12CHSA/GI



PART LIST

Outdoor unit

Model: TAC-09CHSA/GI

No.	Part No.	Part Name	Q'ty	Remark
1	1080050026	Grille	1	
2	1190070021	Top cover	1	
3	1110060083	Condenser	1	
4	1080050004	Outdoor motor supporter	1	
5	1170040058	Outdoor motor	1	
6	1070030016	Propeller fan	1	
7	1080050001	Left grille supporter	2	
8	1080050007	Left grille	1	
9	1080050009	Front plate	2	
10	1080320112	Fan guard	1	
11	1100060052	Compressor and accessories	1	
12	1140020004	Sound arrester	2	420mm*240mm*12mm
13	1120110016	4-way valve	1	
14	1120250427	Three-way valve connecting pipe	1	
15	1120250425	Suction pipe	1	
16	1120250426	Discharge pipe	1	
17	1120250428	Condenser connecting pipe	1	
18	1120250615	Capillary assembly	1	
19	1140020011	Sound arrester	1	750*350*8
20	1080050002	Right plate	1	
21	1080050003	Valve supporter	1	
22	1120120021	Two-way valve	1	
23	1210250121	Base	1	
24	1120130036	Three-way valve	1	
25	1170190003	Inductor	1	
26	1170230007	Pipe Temp. sensor and outdoor Temp. sensor	1	
27	1080320001	Clapboard	1	
28	1170230006	Discharge Temp. sensor	1	
29	1070320202	Sensor holder(ϕ 10)	1	
30	1070040007	Cable clamp(ϕ 10)	1	
31	1170200061	Terminal	1	
32	1170100010	Fan motor capacitor	1	
33	1070320207	Electrical box	1	
34	1090321110	Power source board	1	
35	1090321112	Invert board	1	
36	1090320003	PFC board	1	
37	1170330001	Radiator	1	

PART LIST

Outdoor unit

Model: TAC-09CHSA/GI

No.	Part No.	Part Name	Q'ty	Remark
38	1190070020	Base carton	1	Not shown in explosion view
39	1190700302	Cabinet carton	1	
40	1190070022	Base foaming	1	
41	1190070021	Cover foaming	1	

PART LIST

Outdoor unit

Model: TAC-12CHSA/GI

No.	Part No.	Part Name	Q'ty	Remark
1	1080050026	Grille	1	
2	1080050011	Top cover	1	
3	1110050069	Condenser	1	
4	1080050004	Outdoor motor supporter	1	
5	1170040058	Outdoor motor	1	
6	1070030016	Propeller fan	1	
7	1080050001	Left grille supporter	2	
8	1080050007	Left grille	1	
9	1080050009	Front plate	2	
10	1080320112	Fan guard	1	
11	1100060052	Compressor and accessories	1	
12	1140020004	Sound arrester	2	420mm*240mm*12mm
13	1120500226	4-way valve	1	
14	1120321531	Three-way valve connecting pipe	1	
15	1120321529	Suction pipe	1	
16	1120321530	Discharge pipe	1	
17	1120321532	Condenser connecting pipe	1	
18	1120321525	Capillary assembly	1	
19	1140020011	Sound arrester (750*350*8)	1	
20	1080050002	Right plate	1	
21	1080050002	Valve supporter	1	
22	1120120021	Two-way valve	1	
23	1210250121	Base	1	
24	1120130032	Three-way valve	1	
25	1170190003	Inductor	1	
26	1170200061	Pipe Temp. sensor and outdoor Temp. sensor	1	
27	1080320001	Clapboard	1	
28	1170230006	Discharge Temp. sensor	1	
29	1070320202	Sensor holder(φ 10)	1	Not shown in explosion view
30	1070040007	Cable clamp	1	
31	1170200061	Terminal	1	
32	1170100010	Fan motor capacitor	1	
33	1070320207	Electrical box		
34	1090321110	Power source board		
35	1090321113	Power module		
36	1090320003	PFC board		
37	1170330001	Radiator		

PART LIST

Outdoor unit

Model: TAC-12CHSA/GI

No.	Part No.	Part Name	Q'ty	Remark
38	1190070020	Base carton	1	Not shown in explosion view
39	1190700302	Cabinet carton	1	
40	1190070022	Base foaming	1	
41	1190070021	Cover foaming	1	