

# 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	
<b>Electrical Data</b>					
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	
<b>Refrigerating System</b>					
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			
<b>Fan System</b>					
Indoor air circulation/Hi Cooling		m <sup>3</sup> /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	
<b>Connections</b>					
Refrigerant coupling					
Connecting Pipe	Gas	Inches	3/8"	1/2"	
	Liquid	Inches	1/4"	1/4"	
Connecting Wiring		Size x Core number	3×1.5	3×1.5	
Drainage Pipe		O.D.16mm			
<b>Others</b>					
Suitable area		m <sup>2</sup>	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	

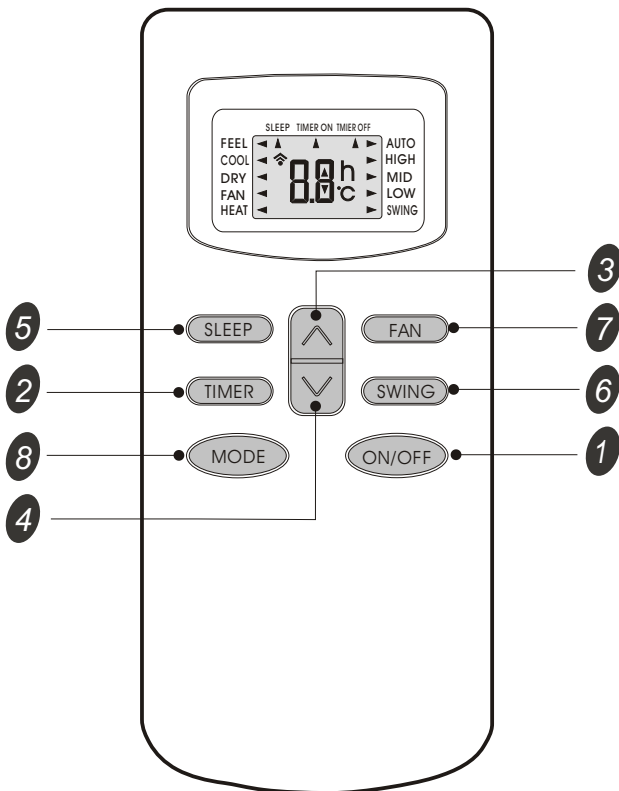
Note:The technical specifications is only reference.

# 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  $\delta t$  to make room temperature closing to set temperature.

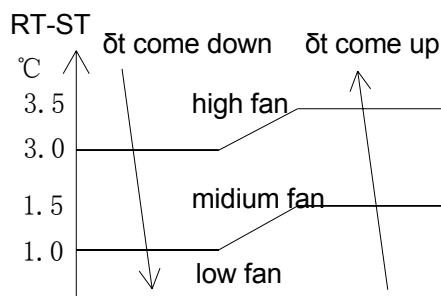
## (2) Outdoor temperature affects running frequency of compressor

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  $30^{\circ}\text{C}$ , the compressor will run in high frequency.

If unit run in "cooling" mode and outdoor temperature is less than  $-1^{\circ}\text{C}$ , controller will shut down compressor and show error code, while the ambient temperature is over  $0^{\circ}\text{C}$ , 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  $\delta t$ , 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  $16^{\circ}\text{C}$  or  $18^{\circ}\text{C}$  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)

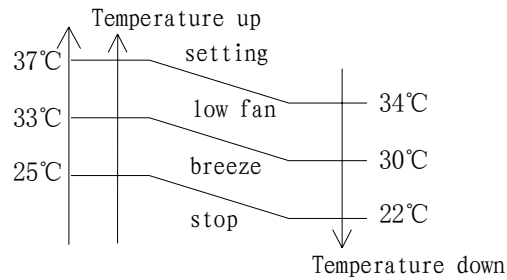
## (1) Frequency control

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

## (2) Indoor fan motor control

## 1. Cold Air Prevention Control

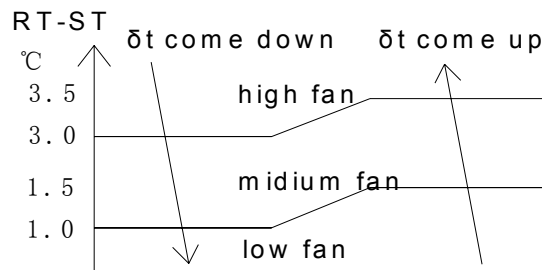
- The function is intended to prevent cold air from being discharged when the heating operation starts or when defrosting.
- The indoor fan speed will be controlled as following.



- 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  $\delta t$ , 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.



























