FUNCTIONAL SPECIFICATIONS

For

AIR CONDITIONING CONTROLLER

Applied to

DT – 04 Plus Heat/Cool (Heater) 50-90°F (with float sensor) Controller

CONTENTS

1. INTRODUCTION

The following describes the features and functional specifications of DT-04 plus Heat/cool (Heater) 50-90°F (with float sensor) controller.

Each set consists of

- Main unit (95 x 112 x 43 mm)

  - Return air sensor (room sensor) (2.50 meters length)

  - Coil sensor (freeze sensor) (2.50 meters length)

  - Float sensor (0.45 meters length)

- Display unit (110 x 118 x 24 mm)

- Display cable (4 meters length)

- Remote unit (optional)

Display unit

2.   USER'S FEATURES
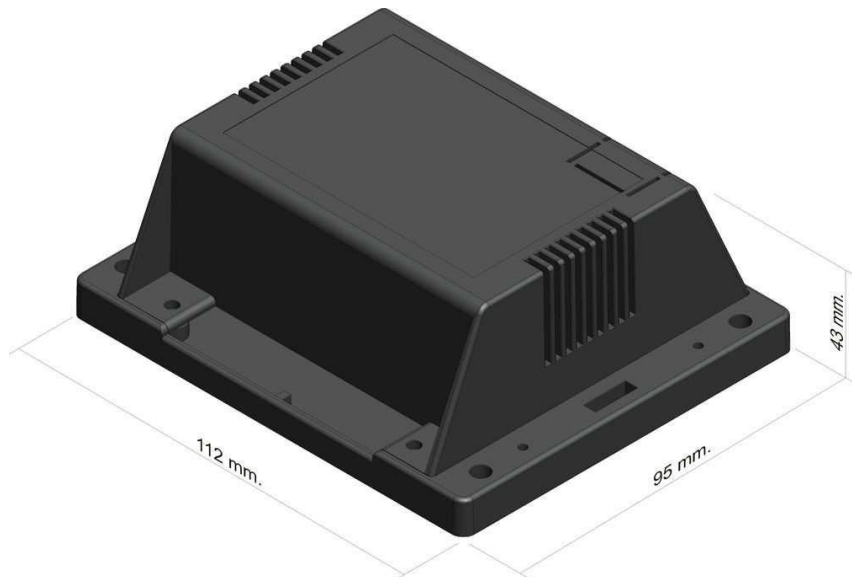
The following features can be operated by the buttons on the Display unit.

2.1   Power on/off

Press [⏻] button will turn on the air conditioner or vice versa. When turn on, it will operate according to the last setting.

2.2   Fan

If R27 is removed out of display PCB, the [A 🜍] button will be disabled. The fan will be able to operate at high speed only.

If R27 is inserted on display PCB, press [A 🜍] button to select the fan speed (high, medium, low or auto). The 7 segments display show the status in blinking for 5 seconds.

FA(AUTO) ➡ F3(HIGH) ➡ F2(MED) ➡ F1(LOW)
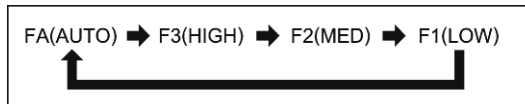
Auto fan speed

When the fan speed is put in auto speed the Auto LED on the Display unit will be lit. The speed will be adjusted automatically according to the difference between the room temperature and setting temperature.

- If the difference is 4°F or more, the speed is high.

- If the difference is 3°F, the speed is medium.

- If the difference is 2°F or less, the speed is low.

2.3   Operating mode

By pressing [MODE] button, the air conditioner can be put in 3 operating modes (fan, cool and heat)

FAN ➡ COOL ➡ HEAT
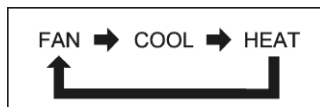
2.3.1   Fan

If the system is put in Fan mode, the Fan LED on the Display unit will be lit. The system will operate as the fan only. The [TEMP ▲] and [TEMP ▼] buttons are not used.

2.3.2   Cool

If the system is put in Cool mode, the Cool LED on the Display unit will be lit. The system will operate as the air conditioner. The compressor will

- operate if $T_{room} \geq = T_{set} +1°F$

- stop if $T_{room} \leq = T_{set}$

However, the compressor is subjected to 5-minute delay protection each time it stops.

2.3.3   Heat

If the system is put in Heat mode, the Heat LED on the display unit will be lit.

The reversing valve relay is used to turn on/off the heater. The heater will

- operate if $T_{room} \leq = T_{set} -1°F$

- stop if $T_{room} \geq = T_{set}$

2.4   Temperature setting

The setting temperature can be set in the range of 50-90°F by pressing [TEMP ▲] or [TEMP ▼] button. The 7 segments LED on the Display unit will show the setting temperature in blinking for 5 seconds. After that it will go back to display the room temperature.

2.5   Timer off

The system can be turned off in advance (from 1-15 hours).

- Press [TIMER] button during the system is on, the 7-segment display will show No. of hour in blinking and the LED on the button will be lit.

- Press [HOUR ▲] or [HOUR ▼] button to change the setting.

2.6   Timer on

Ditto as clause 2.5 but pressing [TIMER] button during the system is off.

2.7 Sleep

Pressing SLEEP button will start the sleep function. The LED on the button will be lit. For cool mode, the setting temperature will be automatically raised up 2°F after one hour.
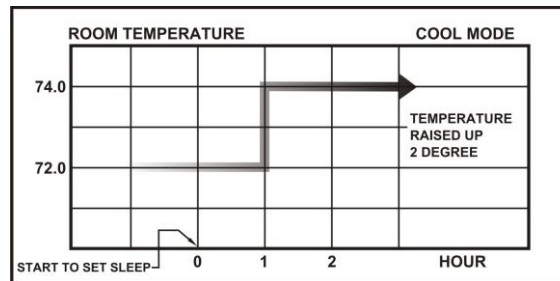
For heat mode, it is similar to cool mode but the temperature is decreased by 2°F after one hour.

Note:

- When the system is put in the sleep mode, press SLEEP button again will cancel the sleep function.

- When the system is put in the sleep mode and the TEMP button is pressed, it will changed the setting temperature 2°F from the last setting.

- When the system is put in the sleep mode and the air conditioner is stopped by the power failure or by turn off, it will cancel the sleep function.

3.   SYSTEM FEATURES

3.1   Watchdog

There is a watchdog circuit to watch the operation of the microprocessor. If it is malfunctioned, this circuit will reset the microprocessor automatically.

3.2   Compressor delay protection

Each time the compressor is off, there will always be a 5 minute time delay before the compressor can restart. In case of power interruption, the system will delay the operation of the compressor in the range of 5-6 minutes in random order. This is to protect the compressors in the air conditioners of the whole building start at the same time.

3.3   Compressor minimum on time

Once the compress starts, it will operate at least 24 seconds.

3.4   Non-volatile memory

The system keeps the setting parameters such as on/off status, fan speed, etc. in its non-volatile memory. If there is a power interruption and back to normal, the control will automatically resume its operation with the same setting parameters (except the sleep and timer function which will be canceled).

If there is any change in the parameter, it will be saved in the non-volatile memory 5 seconds later.

3.5   Heater life protection

While the heater is working or it has stopped less than 30 seconds, the indoor fan must not be stopped. When the heater has stopped more than 30 seconds, the indoor fan can be stopped (by system is off, etc.). This is to dissipate the heat from heater and fan coil unit for their endurance.

3.6   Freeze function

In Cool mode, there is a feature to prevent the evaporator from freezing.

Enter into Freeze process	While in Freeze process	Exit from Freeze process
T_{indoor} coil $\leq 32°F$, and	Comp. stops, and	T_{indoor} coil $\geq 45°F$, or
Comp. runs continuously more than 10 min.	Indoor fan at low speed (in case R27 is inserted), and	System OFF
	Display shows Fr in blinking	

3.7 Cooling Fail

In Cool mode if the compressor (P7 output) has been operating more than 3 minutes but the indoor coil temperature is still above 77°F, the compressor is supposed to be failed. There will be an alarm at the Display unit.

To exit form this status is by turning off the air conditioner or changing the mode of operation.

3.8 Sensor Error

When the room sensor is failed (open/short circuit), the compressor (cool mode) or heater (heat mode) will be turned on and off in 5 minutes cycle.

When the indoor coil sensor is failed (open circuit), the system will operate without any protections or calculations related to indoor coil sensor.

There will be an alarm at the Display unit.

Note : The shorted circuit of indoor coil sensor cannot be detected because it is parallel with float sensor.

3.9 Tank full protection (Float sensor)

If the float sensor is shorted circuit (condensate water is nearly full), the compressor (P7 output) will be stopped. There will be an alarm at the Display unit.

The alarm will stop when the float sensor is opened circuit. After this, the compressor (P7 output) can be operated again when there are no other protections activated and the compressor delay time has been expired.

Note : If the indoor coil sensor is shorted, the controller will also alarm tank full because it is parallel with float sensor.

3.10 Self diagnostic

There is a built-in self diagnostic in the system. When there is any error, the alarm will be shown. The 7 segment display will show
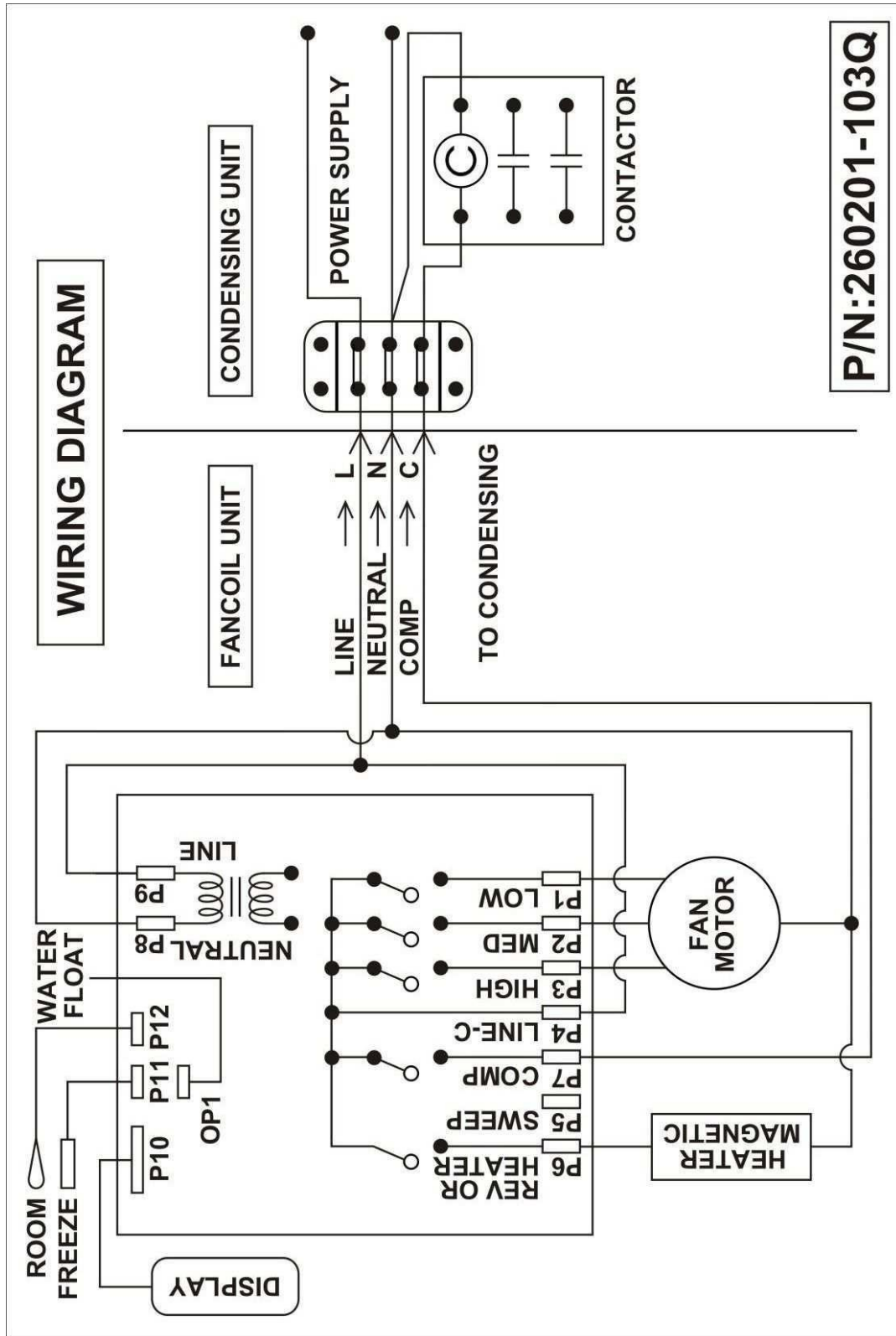
rE in blinking if the room sensor is open or short circuit.

FE in blinking if the freeze sensor is open circuit.

Fr in blinking if the freeze fail function is activated.

CF in blinking if the cooling fail function is activated.

tF in blinking if the float sensor (or coil sensor) is shorted (tank full).

WIRING DIAGRAM

CONDENSING UNIT

POWER SUPPLY

CONTACTOR

P/N:260201-103Q

FANCOIL UNIT

LINE → L

NEUTRAL → N

COMP → C

TO CONDENSING

LINE

P9

NEUTRAL P8

WATER FLOAT

P12 P11

OP1

P10

ROOM

FREEZE

DISPLAY

P1 LOW

P2 MED

P3 HIGH

P4 LINE-C

P7 COMP

P5 SWEEP

P6 HEATER REV OR

FAN MOTOR

HEATER MAGNETIC

Note : Power supply is either 100–120Vac 50/60Hz or 220-240Vac 50/60Hz depends on transformer model.