

# ACU230

## *Twin Power Air Operation Manual*



**固也泰電子工業有限公司**  
KUTAI ELECTRONICS INDUSTRY CO., LTD.



**Headquarters** : No.3, Ln. 201, Qianfu St., Qianzhen Dist., Kaohsiung City 80664, Taiwan

**Tel** : + 886-7-8121771

**Fax** : + 886-7-8121775

**URL** : <http://www.kutai.com.tw>

## 1. INTRODUCTION

The TWIN AC Control is a device to control two Air Conditioners on a Cell-Phone Repeater Station. The ACU230 control automatically transfers from one AC to the other at pre determined times or turns the both units in ON when high indoor temperatures demands it. It constantly monitors the power sources for over and under voltage, over and under current. The control unit also provides dry contactors for each failure and AC ON/OFF status lights making it possible to monitor it remotely. In addition a fully illuminated front panel immediately reports to the operator the condition of the system.

If the ACU230 control unit fails, it has two breakers for manual override, these breakers forces any of the AC ON/OFF.

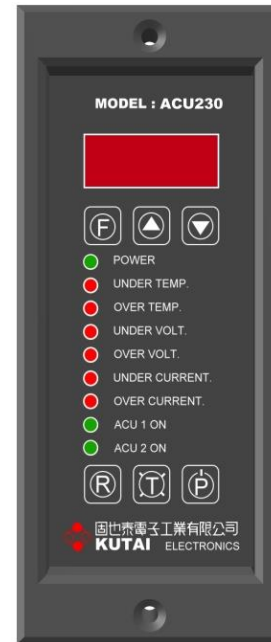
The user can remotely operate both AC from the control center away from station.

The pc-board is protected with epoxy.

## 2. FEATURES

- Power input 220VAC 50/60HZ  $\pm 15\%$ .
- Magnetic contact switch capacity: maximal Ith=32A. (Other sizes available)
- Over and under voltage protection.
- Over and under current protection.
- Real time room temperature display by 7-segment LED.
- Real time voltage and current display.
- Emergency manual override.
- Remote start.
- Easy to adjust protective functions using the front panel controls.
- Clear status indicators: Power on, under temperature, over temperature, under voltage, over voltage, under current, over current, Acu1 on, Acu2 on.
- Dry contacts for remote failure supervise, easy to adopt to any monitoring.
- A single-chip microprocessor is utilized, that make hardware more reliability.
- A removable digital temperature sensor is easy to install anywhere inside the room.
- Temperature error value less than  $\pm 0.5$  °C.
- Programmed memory settings are never loss.
- Dimension: 220 (W) \* 380 (H) \* 140 (D) mm.

## 3. THE ACU230 MODULE



**DISPLAY :** A 4 characters digital monitor indicates temperature or current setting and helps in the programming procedure.

**(F) KEY :** Function select bottom. This bottom can selects which parameter you need to change. ( OV, UV, OC, OT, UT ...etc )

**▲ KEY :** Increase value.

**▼ KEY :** Decrease value.

**(R) KEY :** Reset bottom. this key erases all setting and the control unit returns to preset program.

**(T) KEY :** Lamp test bottom.

**(P) KEY :** The ACU230 control power switch.

---

## 4. FUNCTION SETTING AND ADJUSTMENT

### 4.1 OVER TEMPERATURE SETTING

#### 4.1.1 GENERAL DESCRIPTION

When the temperature is higher than the over temperature setting, the over temperature LED lights up and the ACU230 module provide a dry contactor for an external alarm signal.

The setting range for over temperature is 25°C ~ 40°C and the preset value is 31°C.

#### 4.1.2 ADJUSTMENT

1. Press F key and select "FUN1".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to current temperature display and finish this over temperature setting.

### 4.2 WORKING TEMPERATURE SETTING

#### 4.2.1 GENERAL DESCRIPTION

The working temperature is defined as the best temperature for the room. If the current temperature is over the working temperature setting, the ACU230 control unit starts one of the air-compressors, later the ACU230 shut down the working AC when the temperature reaches 1°C under the working temperature setting.

(The internal setting 1°C is unalterable.) The setting range of working temperature is from 20°C ~ 30°C, and the preset setting is 27°C.

#### 4.2.2 ADJUSTMENT

1. Press F key and select "FUN2".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to current temperature display and finish this new working temperature setting.

### 4.3 TEMPERATURE SETTING FOR THE STANDBY AC

#### 4.3.1 GENERAL DESCRIPTION

If the temperature does not decrease with just one AC, and if the temperature is still high, the standby AC starts and runs together with the main AC.

For example, if the working temperature setting is 25°C and temperature setting for the standby AC is 2°C higher when the room temperature goes over 25°C, only one of the AC runs. But if the temperature goes over 27°C, The controller starts both AC running them together.

When the temperature decrease under 26°C, the ACU230 module will shut down the standby AC..

The setting range of the standby AC temperature is from 1°C ~ 10°C, and the preset setting is 2°C.

#### 4.3.2 ADJUSTMENT

1. Press F key and select "FUN3".
2. Pre Press ▲ or ▼ key until the new value you want to set.
3. W Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to the current temperature display and finish the temperature setting for the standby AC.

### 4.4 UNDER TEMPERATURE SETTING

#### 4.4.1 GENERAL DESCRIPTION

When indoor temperature is lower than the under temperature setting, the under temperature LED illuminates and the ACU230 module provide an independent dry contactor for remote alarm.

The setting range of under temperature is from 10°C ~ 25°C, and the preset value is 20°C.

---

## 4.4.2 ADJUSTMENT

1. Press F key and select "FUN4".
2. Press ▲ or ▼ key until the new value you want to set.
3. Wait Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to current temperature display and finish the under temperature setting.

## 4.5 OVER VOLTAGE SETTING

### 4.5.1 GENERAL DESCRIPTION

The ACU230 control unit can monitor the input AC power quality. When alternating voltage is over the over-voltage setting, the over voltage LED lights up and the ACU230 module provide an independent dry contactor for the alarm signal. When over voltage failure occur the ACU230 will shut down working AC and start the standby AC to continue work until the voltage return to normal.

The setting range of over voltage is from 230VAC ~ 275VAC, and the preset value is 250VAC.

### 4.5.2 ADJUSTMENT

1. Press F key and select "FUN5".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to current temperature display and finish the over voltage setting.

## 4.6 UNDER VOLTAGE SETTING

### 4.6.1 GENERAL DESCRIPTION

The ACU230 control unit can monitor the input AC power quality.

When alternating voltage is under the under-voltage setting, the under voltage LED lights up and the ACU230 module provide an independent dry contactor for the external alarm signal. When under voltage failure occur the ACU230 will shut down working AC and start the standby AC to continue work until the voltage return to normal.

The setting of under voltage is from 210VAC ~ 165VAC, and the preset value is 180VAC.

## 4.6.2 ADJUSTMENT

1. Press F key and select "FUN6".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to current temperature display and finish the under voltage setting.

## 4.7 OVER LOAD CURRENT SETTING

### 4.7.1 GENERAL DESCRIPTION

The over current protect function avoids any damage to your system when external over load or short circuit occurs.

If the ACU230 control unit detects over current on the line the control module shuts down the working AC and start the standby AC to maintain cooling.

The over current LED is illuminated and the ACU230 module provide an independent dry contactor for the external alarm signal. This error message will not be erased until user presses the P key to shut down and restart the ACU230 module. The operation current must be different for different air-compressor, so please refer to air-compressor's user guide before you set the over current.

The setting range for over current is from 5A ~ 50A, and the preset value is 20A over-current.

### NOTE :

**CHECK IF THE EXTERNAL POWER AND THE LOAD IS NORMAL BEFORE YOU RESTART THE ACU230 CONTROL UNIT.**

### 4.7.2 ADJUSTMENT

1. Press F key and select "FUN7".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for 5 sec let the microprocessor read the new value and change its internal settings.
4. The monitor returns to current temperature display and records the new over load current setting.

---

## **4.8 DER ACTION CURRENT SETTING**

### **4.8.1 GENERAL DESCRIPTION**

The ACU230 control continually monitors the load current for each AC when they are running. If the current is lower than the under current setting, the control unit judges this air-compressor is defective shutting down this unit and start the other AC to continue cooling. Subsequently the under current LED lights up and the ACU230 module activates an independent dry contactor to activate and external alarm signal. This error message cannot be erased until the user presses the P button to reset the module.

The setting range for under current is from 0A ~ 10A, and the preset value is 0.0A.

#### **NOTE :**

**IF UNDER CURRENT TRIPS, YOU MUST RESET THE ACU230 CONTROLLER BY PRESS THE POWER KEY.**

### **4.8.2 ADJUSTMENT**

1. Press F key and select "FUN8".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for about 5 sec then the microprocessor will read current value and change the internal setting.
4. The monitor returns to current temperature display and finish the under action current setting.

## **4.9 CHANGE OVER TIME SETTING**

### **4.9.1 GENERAL DESCRIPTION**

The ACU230 control unit automatically transfers the working air-compressor to standby air-compressor after change over time. This function will make these two air-compressors have same working hours.

The setting range of change over time is 1hour ~ 168hours, and the outgoing setting value is 24 hours.

### **4.9.2 ADJUSTMENT**

1. Press F key and select "FUN9".
2. Press ▲ or ▼ key until the new value you want to set.
3. Waiting for 5 sec let the microprocessor read the new value and change its internal settings.

4. The monitor returns to current temperature display and finish the change over time setting.

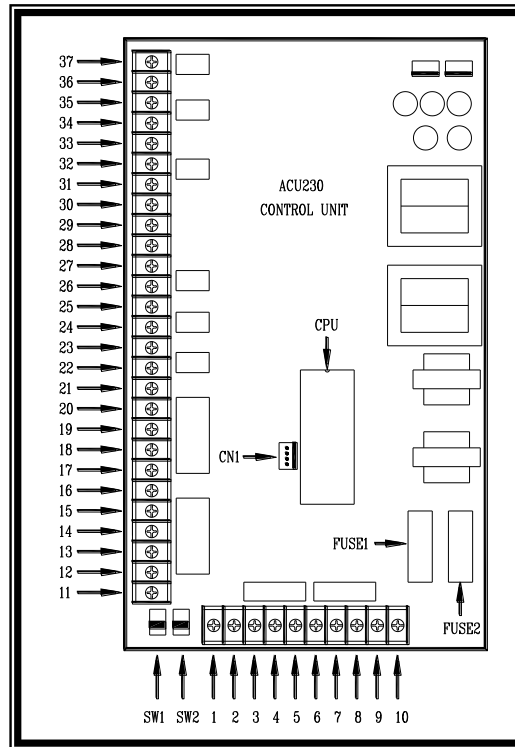
## **4.10 REAL-TIME VOLTAGE AND CURRENT DISPLAY**

The ACU230 control unit provided user could read real-time voltage and current from front display without any meter. It is very useful to help user understand and monitor the air-compressors working condition.

To read the data off the ACU1, press the "F" key until the display shows "Acu1". Then display shows ACU1 real-time voltage & current about 12 sec and automatically return to normal status.

To read the real-time data from the ACU2, press the "F" key until display shows "Acu2" The display will show ACU2 real-time voltage & current about 12 sec and then automatically return to normal status.

## 5. WIRING AND TERMINAL BLOCK



### NOTE :

#### THE TERMINAL POSITION PLEASE REFER THE DIAGRAM BELOW.

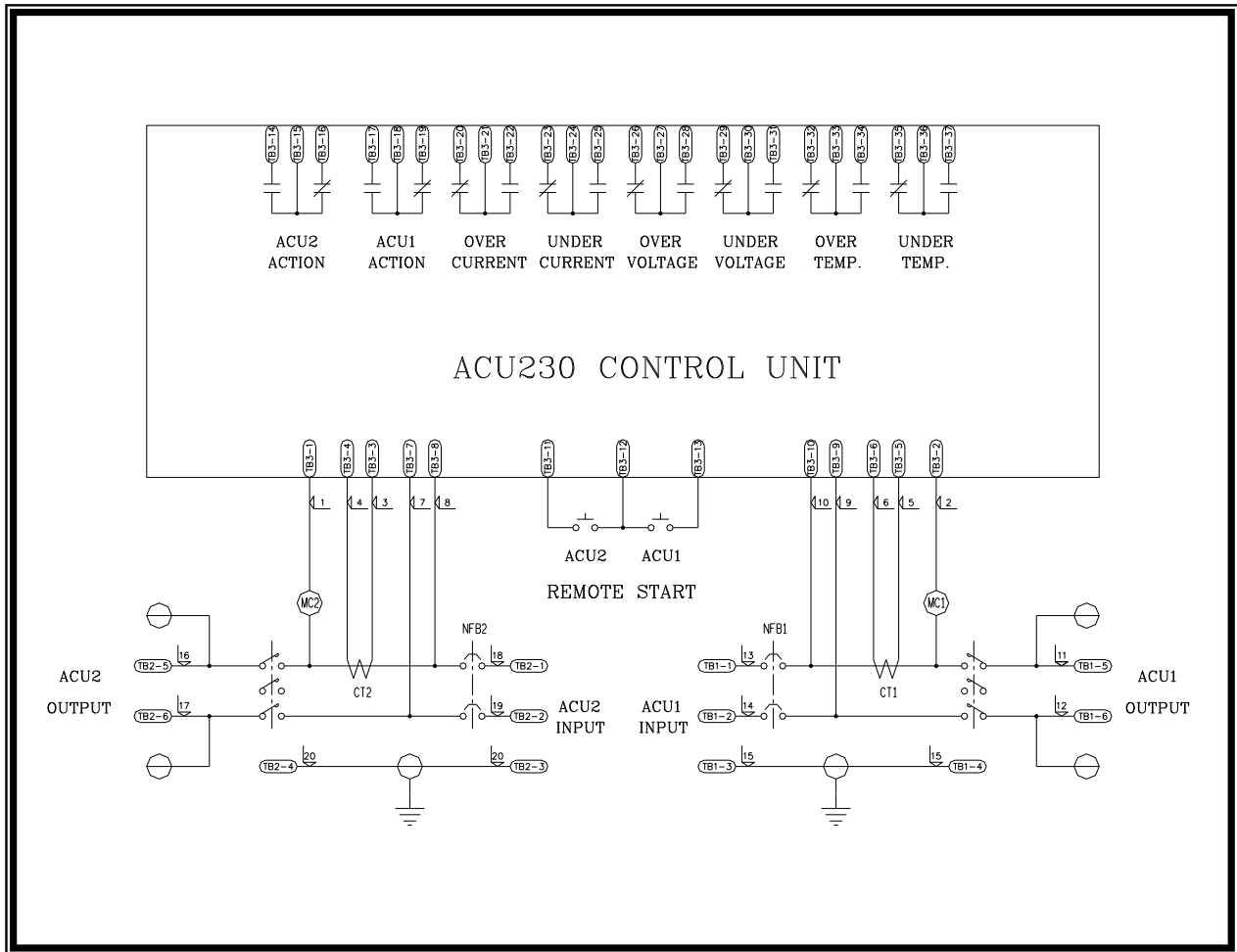
1. Terminal 1: The ACU2 Magnetic contact switch control terminals.
2. Terminal 2: The ACU1 Magnetic contact switch control terminals.
3. Terminal 3&4: The ACU2 current transformer signal input terminals.
4. Terminal 5&6: The ACU1 current transformer signal input terminals.
5. Terminal 7&8: The ACU1 alternating power source input terminals.
6. Terminal 9&10: The ACU2 alternating power source input terminals.
7. Terminal 11~13: The ACU1 and ACU2 remote start signal input terminals.

When terminal 12 and 13 close, then the ACU1 start.

When terminal 12 and 11 close, then the ACU2 start.

8. Terminal 14~16: The ACU2 on auxiliary free contactors terminals.
9. Terminal 17~19: The ACU1 on auxiliary free contactors terminals.
10. Terminal 20~22: The over current alarm auxiliary free contactors terminals.
11. Terminal 23~25: The under current alarm auxiliary free contactors terminals.
12. Terminal 26~28: The over voltage alarm auxiliary free contactors terminals.
13. Terminal 29~31: The under voltage alarm auxiliary free contactors terminals.
14. Terminal 32~34: The over temperature alarm auxiliary free contactors terminals.
15. Terminal 35~37: The under temperature alarm auxiliary free contactors terminals.
16. SW1 : The manual force ACU1 start switch.
17. SW2 : The manual force ACU2 start switch.
18. CN1: The temperature sensor connects housing.
19. Fuse 1: The ACU1 input power protect fuse.
20. Fuse 2: The ACU2 input power protect fuse.

## 6. TWIN POWER AIR ATS CONNECT WIRE DIAGRAM



7. EXEMPLIFICATION OF INSTALLATION

