

# **TECHNICAL SERVICE MANUAL**

— **Bird Series**

GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI

Jinji West Rd. Qianshan Zhuhai

Guangdong China

# Introduction

In this technical service manual, you will find rich references to Bird Series products, including photos, technical specifications, explosive views, spare parts lists and circuit diagrams. Service people and engineers of Gree's customers and distributors would find it a very handy source of technical information of our products.

Technical Support Department  
GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI  
Nov. 2002

**Editor In Chief:** Chen Jianmin

**Compiler:** Chen Zhian   Ouyang Jun   Tian Guoku  
Cao Xuan   Jia Tianwei   Wang Min   Yang Rong

**Proofreader:** Ouyang Jun   Bian Li   Cui Yanpeng   Li Jiangyun   Li Jiantao   Ou Ruyan  
Xiao Kai   Yang Cuilan   Yang Meng   Ye Jingchun   Ye Xiangyang  
Yin Xiangtian   Zhuang Rong   Zhu Yunqing

**Designer of Cover:** Li Jiesheng   Sheng Zhiguo

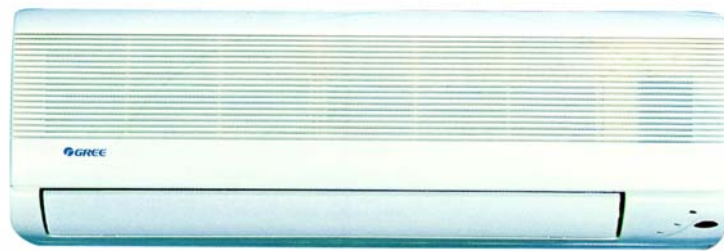
# CONTENTS

|   |     |
|---|-----|
| <b>1. Bird Single-Split type</b> .....                        | 1   |
| 1.1 Summary .....   | 1   |
| 1.2 Technical specifications .....                            | 3   |
| 1.3 Performance curves .....                                  | 15  |
| 1.4 Outlines and dimensions of indoor unit .....              | 18  |
| 1.5 Outlines and dimensions of outdoor unit .....             | 19  |
| 1.6 Explosive view and spare parts list of indoor unit .....  | 22  |
| 1.7 Explosive view and spare parts list of outdoor unit ..... | 34  |
| 1.8 Circuit diagram .....                                     | 40  |
| 1.9 PCB function manual .....                                 | 54  |
| <b>2. Bird Dual-Split type</b> .....                          | 59  |
| 2.1 Summary .....   | 59  |
| 2.2 Technical specifications .....                            | 61  |
| 2.3 Performance curves .....                                  | 68  |
| 2.4 Outlines and dimensions of indoor unit .....              | 71  |
| 2.5 Outlines and dimensions of outdoor unit .....             | 72  |
| 2.6 Explosive view and spare parts list of indoor unit .....  | 74  |
| 2.7 Explosive view and spare parts list of outdoor unit ..... | 80  |
| 2.8 Circuit diagram .....                                     | 84  |
| 2.9 PCB function manual .....                                 | 90  |
| <b>3. Bird Multi-Split type</b> .....                         | 95  |
| 3.1 Summary .....   | 95  |
| 3.2 Technical specifications .....                            | 97  |
| 3.3 Performance curves .....                                  | 100 |

|   |            |
|---|------------|
| 3.4 Outlines and dimensions of indoor unit .....              | 103        |
| 3.5 Outlines and dimensions of outdoor unit .....             | 104        |
| 3.6 Explosive view and spare parts list of indoor unit .....  | 106        |
| 3.7 Explosive view and spare parts list of outdoor unit ..... | 110        |
| 3.8 Circuit diagram .....                                     | 113        |
| 3.9 PCB function manual .....                                 | 117        |
| <b>4. Bird Inverter type .....</b>                            | <b>123</b> |
| 4.1 Summary .....   | 123        |
| 4.2 Technical specifications .....                            | 127        |
| 4.3 Performance curves .....                                  | 131        |
| 4.4 Outlines and dimensions of indoor unit .....              | 134        |
| 4.5 Outlines and dimensions of outdoor unit .....             | 135        |
| 4.6 Explosive view and spare parts list of indoor unit .....  | 136        |
| 4.7 Explosive view and spare parts list of outdoor unit ..... | 142        |
| 4.8 Circuit diagram .....                                     | 150        |
| 4.9 PCB function manual .....                                 | 155        |
| 4.10 Troubleshooting .....                                    | 183        |

## 4. Bird Inverter type

### 4.1 Summary



#### MODEL

KFR-25GW/A12F  
KFR-32GW/A12F

#### NOTE

CE STANDARD  
1Ph 220-230V 50Hz  
R22

## Bird Series

---



### MODEL

### NOTE

KFR-25X2GW/A12F  
KFR-25X3GW/A12F  
KFR-18X4GW/A12F

CE STANDARD  
1Ph 220-230V 50Hz  
R22

## 4.2 Technical specifications.

Table 4-1

| Model                       |                                   | KFR-25GW/A12F            |                | KFR-32GW/A12F   |                |
|-----------------------------|-----------------------------------|--------------------------|----------------|-----------------|----------------|
| Function                    |                                   | Cooling                  | Heating        | Cooling         | Heating        |
| Power supply                |                                   | 1Ph 220-230V 50Hz        |                |                 |                |
| Capacity(W)                 |                                   | 2500(900~2900)           | 3200(900~3600) | 3200(900~3500)  | 3700(900~4100) |
| Rated input(W)              |                                   | 950                      | 1200           | 1200            | 1400           |
| Rated current(A)            |                                   | 4.86                     | 6.2            | 5.9             | 7.2            |
| Air flow(m <sup>3</sup> /h) |                                   | 420                      |                | 450             |                |
| Dehumidifying volume(L/h)   |                                   | 1.3                      | ---            | 1.8             | ---            |
| EER(W/W)                    |                                   | 2.63                     | 2.67           | 2.67            | 2.64           |
| Indoor unit                 | Model                             | KFR-25G/A12F             |                | KFR-32G/A12F    |                |
|                             | Motor fan speed(rpm)              | 1120/1020/920            |                | 1190/1100/950   |                |
|                             | Output power(W)                   | 14                       |                |                 |                |
|                             | Fan type/piece                    | Cross flow fan-1         |                |                 |                |
|                             | Diameter-length                   | φ 97mm-583               |                |                 |                |
|                             | Evaporator                        | Aluminum fin-copper tube |                |                 |                |
|                             | Row-fin distance(mm)              | 2-1.4                    |                |                 |                |
|                             | Working area(m <sup>2</sup> )     | 0.14                     |                |                 |                |
|                             | Swing motor                       | MP24GA                   |                |                 |                |
|                             | Input/speed(W)                    | 2                        |                |                 |                |
|                             | Fuse(A)                           | Controller3.15A          |                | transformer0.2A |                |
|                             | Working capacitor(μF)             | 1                        |                |                 |                |
|                             | Noise(dB(A))                      | ≤ 38                     |                | ≤ 39            |                |
|                             | Dimension(width-height-depth)(mm) | 770 × 250 × 180          |                |                 |                |
|                             | Net weight(Kg)                    | 8.5                      |                |                 |                |
| Outdoor unit                | Model                             | KFR-25W/A12F             |                | KFR-32W/A12F    |                |
|                             | Input power(W)                    | 934/1184                 |                | 1184/1384       |                |
|                             | Current(A)                        | 4.72/6.06                |                | 5.76/7.06       |                |
|                             | L.R.A.(A)                         | 22                       |                | 29              |                |
|                             | Throttling method                 | Capillary                |                |                 |                |
|                             | Compressor                        | C-1RB102H12AA            |                | C-1RV73HOS      |                |
|                             | Starting method                   | Inverter starting        |                |                 |                |
|                             | Working temp.                     | ≤ 115℃                   |                |                 |                |
|                             | Condenser                         | Aluminum fin-copper tube |                |                 |                |
|                             | Pipe-diameter                     | 9.52                     |                |                 |                |
|                             | Row-fin distance(mm)              | 1-1.6                    |                | 2-1.8           |                |
|                             | Working area(m <sup>2</sup> )     | 0.4                      |                | 0.8             |                |
|                             | Fan motor power(W)/speed(rpm)     | 25/730                   |                | 25/730          |                |
|                             | Type-piece                        | Axial fan-1              |                |                 |                |
|                             | Diameter(mm)                      | 400                      |                |                 |                |
|                             | Defrosting method                 | Auto defrost             |                |                 |                |
|                             | Noise(dB(A))                      | 52                       |                |                 |                |
|                             | Dimension(width-height-depth)(mm) | 848-540-320              |                |                 |                |
|                             | Net weight(Kg)                    | 40                       |                | 41              |                |
| Refrigerant charge(Kg)      | R22/0.75                          |                          | R22/1.05       |                 |                |
| Connecting pipe             | Length(m)                         |                          | 4              |                 |                |
|                             | Outer diameter of connecting pipe | Liquid pipe(mm)          | 6 (1/4")       |                 |                |
|                             |                                   | Gas pipe(mm)             | 9.52(3/8")     |                 | 12(1/2")       |
|                             | Max distance                      | Height(m)                | 5              |                 |                |
| Length(m)                   |                                   | 10                       |                |                 |                |

The technical data are subject to change without notice .Please refer to the nameplate of the unit.

## Bird Series

Table 4-2

| Model                        |                                   | KFR-25X2GW/A12F          |                  |
|------------------------------|-----------------------------------|--------------------------|------------------|
| Content                      |                                   |                          |                  |
| Function                     |                                   | Cooling                  | Heating          |
| Power supply                 |                                   | 1Ph 220-230V 50Hz        |                  |
| Capacity (W)                 |                                   | 5000(1000~5800)          | 6000(1800~7000)  |
| Rated input (W)              |                                   | 1720                     | 2300             |
| Rated current (A)            |                                   | 8.2                      | 11.0             |
| Air flow (m <sup>3</sup> /h) |                                   | 450                      |                  |
| Dehumidifying volume (L/h)   |                                   | 1.6                      | ---              |
| C.O.P(W/W)                   |                                   | 2.9                      | 2.6              |
| Indoor unit                  | Model                             | KFR-25X2G/A12F           |                  |
|                              | Motor fan speed(rpm)              | 1190/1100/950            |                  |
|                              | Output power(w)                   | 14                       |                  |
|                              | Fan type/piece                    | Cross flow fan-1         |                  |
|                              | Diameter-length                   | φ 97mm-583               |                  |
|                              | Evaporator                        | Aluminum fin-copper tube |                  |
|                              | Row-fin distance(mm)              | 2-1.6                    |                  |
|                              | Working area(m <sup>2</sup> )     | 0.14                     |                  |
|                              | Swing motor                       | MP24GA                   |                  |
|                              | Input/Power(W)                    | 2                        |                  |
|                              | Fuse(A)                           | Controller 3.15A         | Transformer 0.2A |
|                              | Working capacitor( μF)            | 1                        |                  |
|                              | Noise(dB(A))                      | ≤ 40                     |                  |
|                              | Dimension(width-height-depth)(mm) | 770 × 250 × 180          |                  |
| Net weight(Kg)               | 8.5                               |                          |                  |
| Outdoor unit                 | Model                             | KFR-25X2W/A12F           |                  |
|                              | Input power (W)                   | 1660/2270                |                  |
|                              | Current (A)                       | 7.7/10.5                 |                  |
|                              | L.R.A. (A)                        | 78                       |                  |
|                              | Throttling method                 | electric expansion valve |                  |
|                              | Compressor                        | QXBS-23(F)               |                  |
|                              | Starting method                   | transducer starting      |                  |
|                              | Working temp.                     | ≤ 115℃                   |                  |
|                              | Condenser                         | Aluminum fin-copper tube |                  |
|                              | Pipe-diameter                     | 9.52                     |                  |
|                              | Row-fin distance(mm)              | 1-1.6                    |                  |
|                              | Working area(m <sup>2</sup> )     | 0.4                      |                  |
|                              | Fan motor power(W)/speed(rpm)     | 120/ 780/620             |                  |
|                              | Type-piece                        | Axial fan-1              |                  |
|                              | Diameter(mm)                      | 400                      |                  |
|                              | Defrosting method                 | Auto defrost             |                  |
|                              | Noise(dB(A))                      | 57                       |                  |
|                              | Dimension(mm)(width-height-depth) | 848 × 540 × 320          |                  |
| Net weight(Kg)               | 64                                |                          |                  |
| Refrigerant charge(Kg)       | R22/1.7                           |                          |                  |
| Connecting pipe              | Length(m)                         | 4                        |                  |
|                              | Outer diameter of connecting pipe | Liquid pipe (mm)         | 6(1/4")          |
|                              |                                   | Gas pipe (mm)            | 9.52(3/8")       |
|                              | Max distance                      | Height (m)               | 5                |
| Length (m)                   |                                   | 10                       |                  |

The technical data are subject to change without notice .Please refer to the nameplate of the unit.



## Bird Series

Table 4-3

| Model                        |                                   | KFR-25X3GW/A12F   |                                   |
|------------------------------|-----------------------------------|-------------------|-----------------------------------|
| Content                      |                                   |                   |                                   |
| Function                     |                                   | Cooling           | Heating                           |
| Power supply                 |                                   | 1Ph 220-230V 50Hz |                                   |
| Capacity (W)                 |                                   | 7000(1000~7500)   | 8100(1500~8800)                   |
| Rated input (W)              |                                   | 3000              | 3300                              |
| Rated current (A)            |                                   | 15                | 17                                |
| Air flow (m <sup>3</sup> /h) |                                   | 450               |                                   |
| Dehumidifying volume (L/h)   |                                   | 1.6               | ---                               |
| C.O.P(W/W)                   |                                   | 2.33              | 2.45                              |
| Indoor unit                  | Model                             |                   | KFR-25X3G/A12F                    |
|                              | Motor fan speed(rpm)              |                   | 1190/1100/950                     |
|                              | Output power(w)                   |                   | 14                                |
|                              | Fan type/piece                    |                   | Cross flow fan-1                  |
|                              | Diameter-length                   |                   | φ 97mm-583                        |
|                              | Evaporator                        |                   | Aluminum fin-copper tube          |
|                              | Row-fin distance(mm)              |                   | 2-1.6                             |
|                              | Working area(m <sup>2</sup> )     |                   | 0.14                              |
|                              | Swing motor                       |                   | MP24GA                            |
|                              | Input/Power(W)                    |                   | 2                                 |
|                              | Fuse(A)                           |                   | Controller 3.15A Transformer 0.2A |
|                              | Working capacitor( μF)            |                   | 1                                 |
|                              | Noise(dB(A))                      |                   | ≤ 40                              |
|                              | Dimension(width-height-depth)(mm) |                   | 770 × 250 × 180                   |
|                              | Net weight(Kg)                    |                   | 8.5                               |
| Outdoor unit                 | Model                             |                   | KFR-25X3W/A12F                    |
|                              | Input power (W)                   |                   | 2910/3210                         |
|                              | Current (A)                       |                   | 14/16                             |
|                              | L.R.A. (A)                        |                   | 78                                |
|                              | Throttling method                 |                   | electric expansion valve          |
|                              | Compressor                        |                   | QXBS-26(F)                        |
|                              | Starting method                   |                   | transducer starting               |
|                              | Working temp.                     |                   | ≤ 115℃                            |
|                              | Condenser                         |                   | Aluminum fin-copper tube          |
|                              | Pipe-diameter                     |                   | 9.52                              |
|                              | Row-fin distance(mm)              |                   | 1-1.6                             |
|                              | Working area(m <sup>2</sup> )     |                   | 0.4                               |
|                              | Fan motor power(W)/speed(rpm)     |                   | 130/ 850/750/520                  |
|                              | Type-piece                        |                   | Axial fan-1                       |
|                              | Diameter(mm)                      |                   | 450                               |
|                              | Defrosting method                 |                   | Auto defrost                      |
|                              | Noise(dB(A))                      |                   | 60                                |
|                              | Dimension(mm)(width-height-depth) |                   | 950 × 700 × 412                   |
|                              | Net weight(Kg)                    |                   | 72                                |
| Refrigerant charge(Kg)       |                                   | R22/2.2           |                                   |
| Connecting pipe              | Length(m)                         |                   | 4                                 |
|                              | Outer diameter of connecting pipe | Liquid pipe (mm)  | 6(1/4")                           |
|                              |                                   | Gas pipe (mm)     | 9.52(3/8")                        |
|                              | Max distance                      | Height (m)        | 5                                 |
|                              |                                   | Length (m)        | 10                                |

The technical data are subject to change without notice .Please refer to the nameplate of the unit.

## Bird Series

Table 4-4

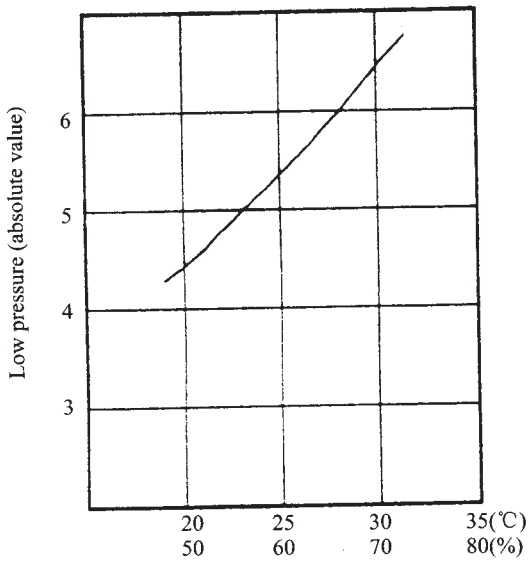
| Model                        |                                   | KFR-18X4GW/A12F          |                  |
|------------------------------|-----------------------------------|--------------------------|------------------|
| Content                      |                                   |                          |                  |
| Function                     |                                   | Cooling                  | Heating          |
| Power supply                 |                                   | 1Ph 220-230V 50Hz        |                  |
| Capacity (W)                 |                                   | 7500(900~8000)           | 7800(1500~8800)  |
| Rated input (W)              |                                   | 2730                     | 2300             |
| Rated current (A)            |                                   | 11.9                     | 10               |
| Air flow (m <sup>3</sup> /h) |                                   | 450                      |                  |
| Dehumidifying volume (L/h)   |                                   | 2.0                      |                  |
| C.O.P(W/W)                   |                                   | 2.68                     | 3.4              |
| Indoor unit                  | Model                             | KFR-18X4G/A12F           |                  |
|                              | Motor fan speed(rpm)              | 1175/1100/950            |                  |
|                              | Output power(w)                   | 14                       |                  |
|                              | Fan type/piece                    | Cross flow fan-1         |                  |
|                              | Diameter-length                   | φ 97mm-583               |                  |
|                              | Evaporator                        | Aluminum fin-copper tube |                  |
|                              | Row-fin distance(mm)              | 2-1.4                    |                  |
|                              | Working area(m <sup>2</sup> )     | 0.14                     |                  |
|                              | Swing motor                       | MP24GA                   |                  |
|                              | Input/Power(W)                    | 2                        |                  |
|                              | Fuse(A)                           | Controller 3.15A         | Transformer 0.2A |
|                              | Working capacitor( μF)            | 1                        |                  |
|                              | Noise(dB(A))                      | ≤ 40                     |                  |
|                              | Dimension(width-height-depth)(mm) | 770 × 250 × 180          |                  |
|                              | Net weight(Kg)                    | 8.5                      |                  |
| Outdoor unit                 | Model                             | KFR-18X4W/A12F           |                  |
|                              | Input power (W)                   | 2610/2180                |                  |
|                              | Current (A)                       | 11.35/9.48               |                  |
|                              | L.R.A. (A)                        | 28                       |                  |
|                              | Throttling method                 | electric expansion valve |                  |
|                              | Compressor                        | C-6RV73H0H               |                  |
|                              | Starting method                   | Power supply module      |                  |
|                              | Working temp.                     | ≤ 115℃                   |                  |
|                              | Condenser                         | Aluminum fin-copper tube |                  |
|                              | Pipe-diameter                     | 9.52                     |                  |
|                              | Row-fin distance(mm)              | 2-1.6                    |                  |
|                              | Working area(m <sup>2</sup> )     | 0.6                      |                  |
|                              | Fan motor power(W)/speed(rpm)     | 120/ 850/520             |                  |
|                              | Type-piece                        | Axial fan-1              |                  |
|                              | Diameter(mm)                      | 455                      |                  |
|                              | Defrosting method                 | Auto defrost             |                  |
|                              | Noise(dB(A))                      | 60                       |                  |
|                              | Dimension(mm)(width-height-depth) | 950 × 840 × 420          |                  |
|                              | Net weight(Kg)                    | 72                       |                  |
| Refrigerant charge(Kg)       | R22/2.2                           |                          |                  |
| Connecting pipe              | Length(m)                         | 4                        |                  |
|                              | Outer diameter of connecting pipe | Liquid pipe (mm)         | 6(1/4")          |
|                              |                                   | Gas pipe (mm)            | 9.52(3/8")       |
|                              | Max distance                      | Height (m)               | 5                |
|                              |                                   | Length (m)               | 10               |

The technical data are subject to change without notice .Please refer to the nameplate of the unit.

### 4.3 Performance curves

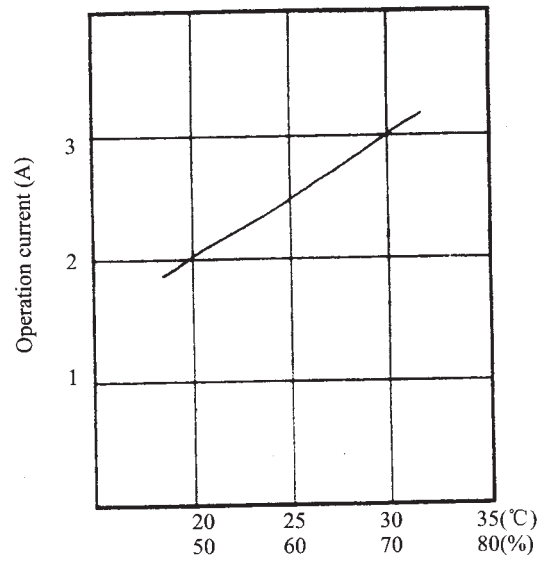
- Technical date
- Performance curve as fig1 fig2
- The change relation between low pressure , operation current and temp.

Cooling operation condition :In testing , indoor and outdoor have same work condition.



Dry bulb temp. / humidity

(a)

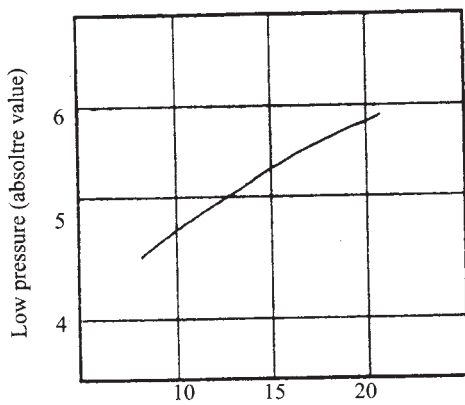


Dry bulb temp. / humidity

(b)

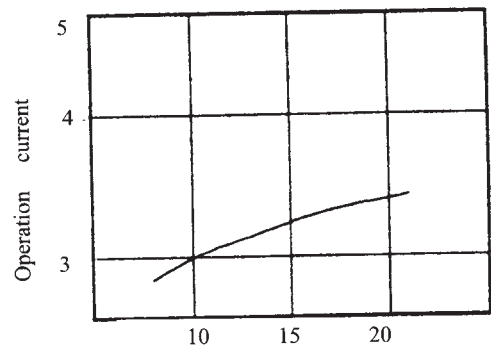
Heating operation

Indoor work condition : dry bulb temp. 21 ,wet bulb temp. 15.5



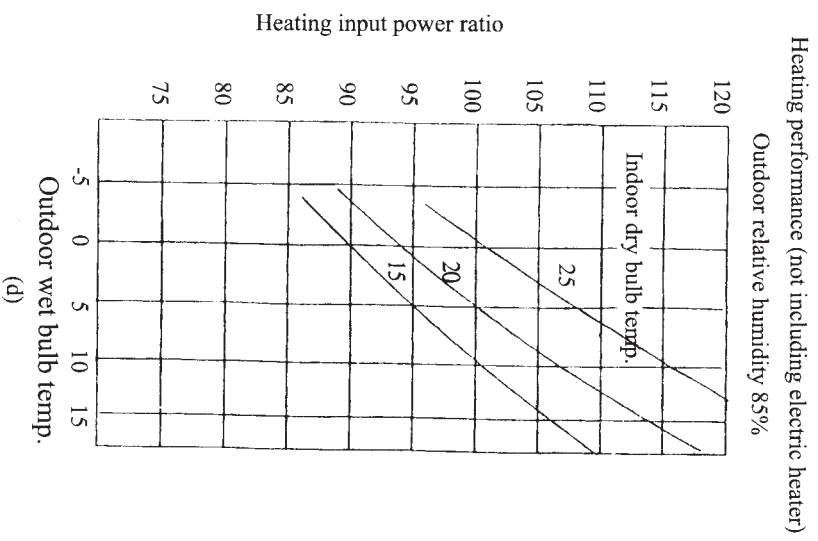
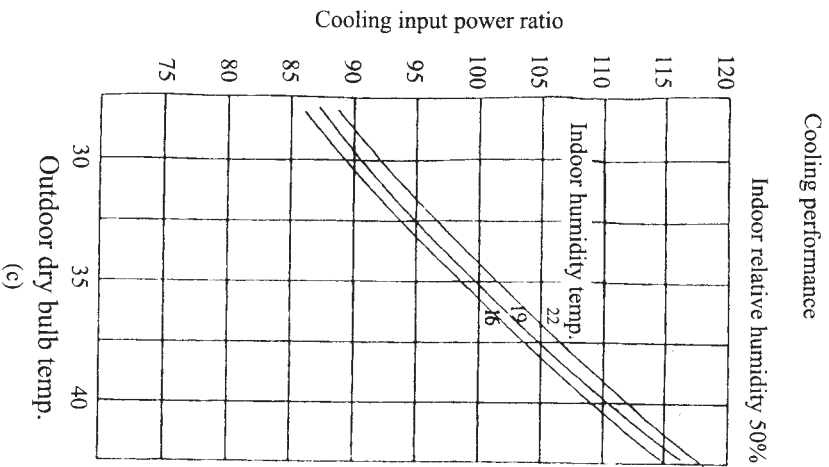
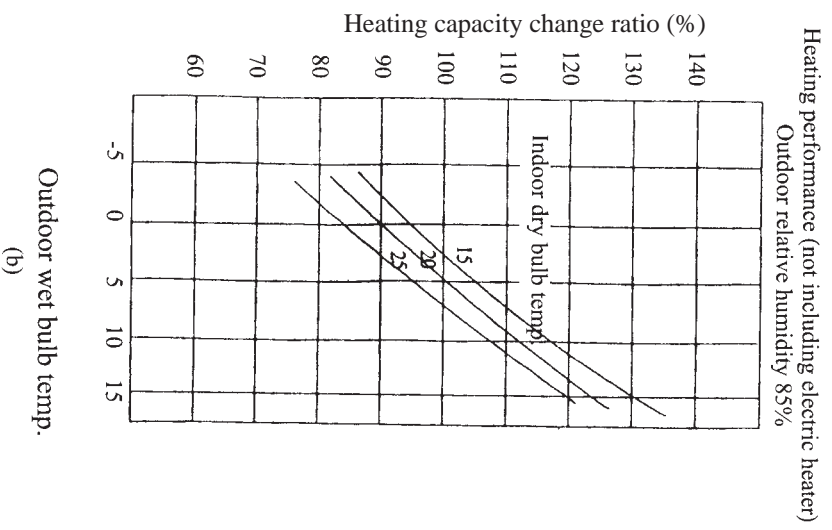
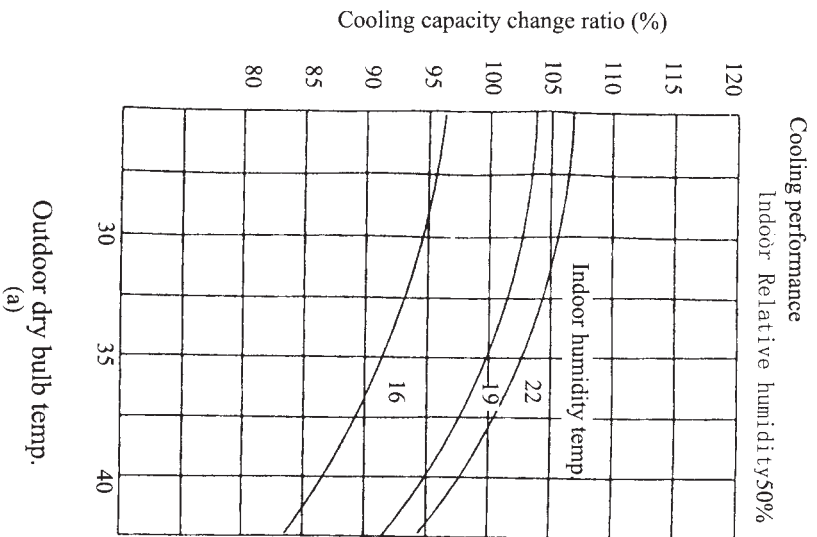
Outdoor dry bulb temp.

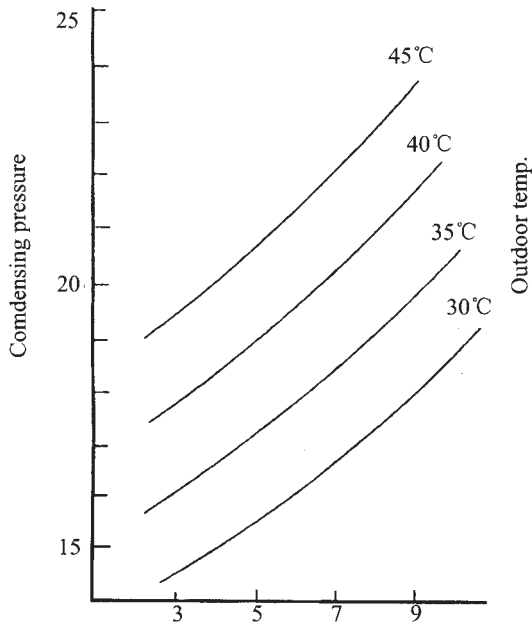
(c)



Outdoor dry bulb temp.

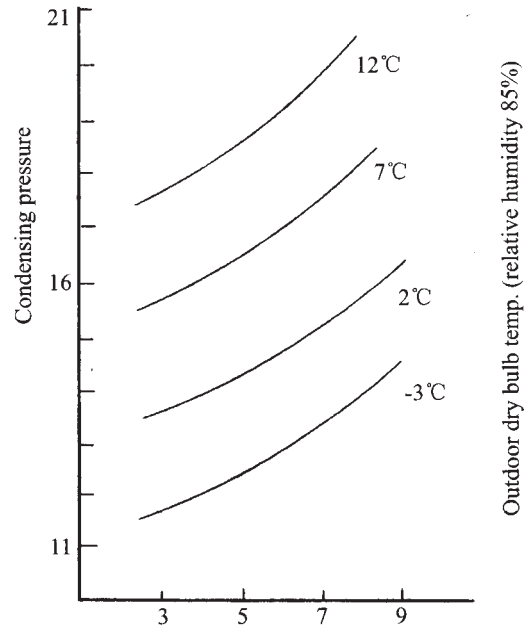
(d)





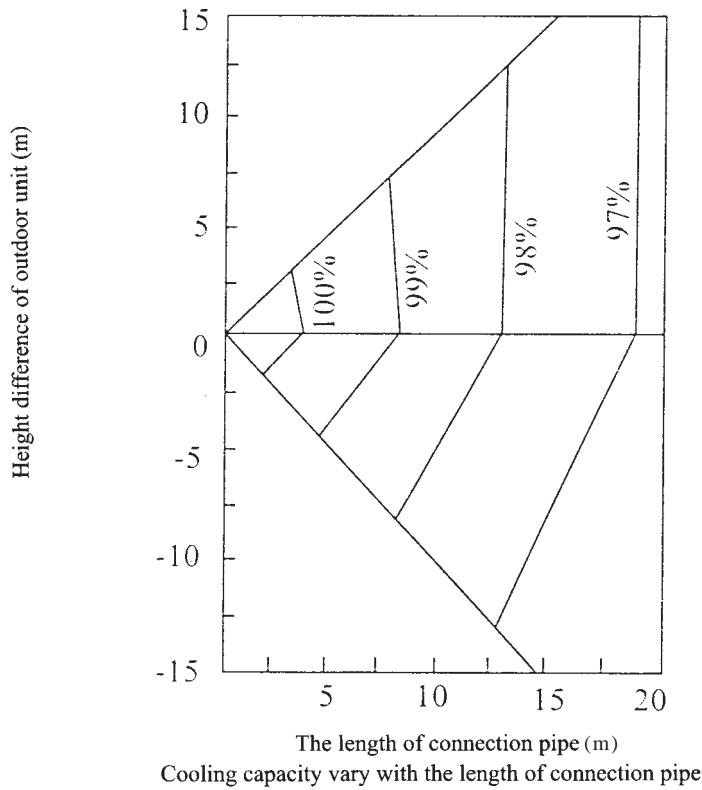
The affection to the charging quantity by pressure under cooling work condition.  
(Indoor work condition: dry bulb 27°C, wet bulb 19.5°C)

(e)

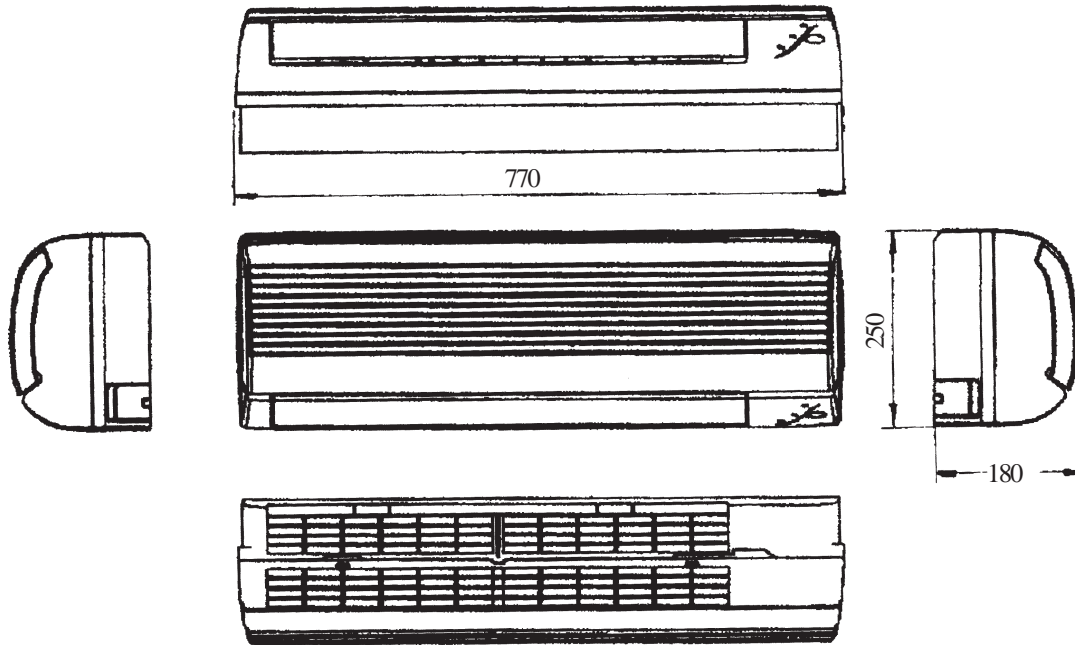


The affection to the charging quantity by pressure under heating work condition.  
(Indoor work condition: dry bulb 21°C)

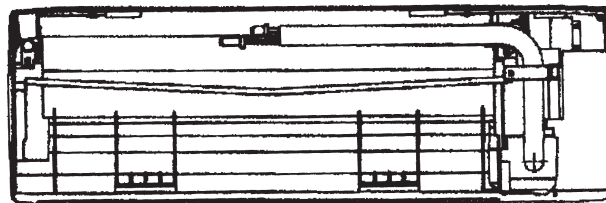
(f)



### 4.4 Outlines and dimensions of indoor unit

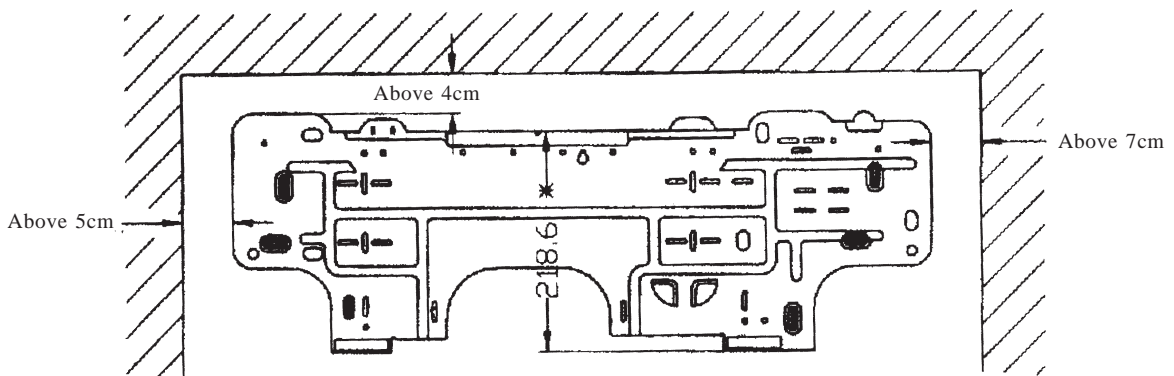


Back view



Unit:mm

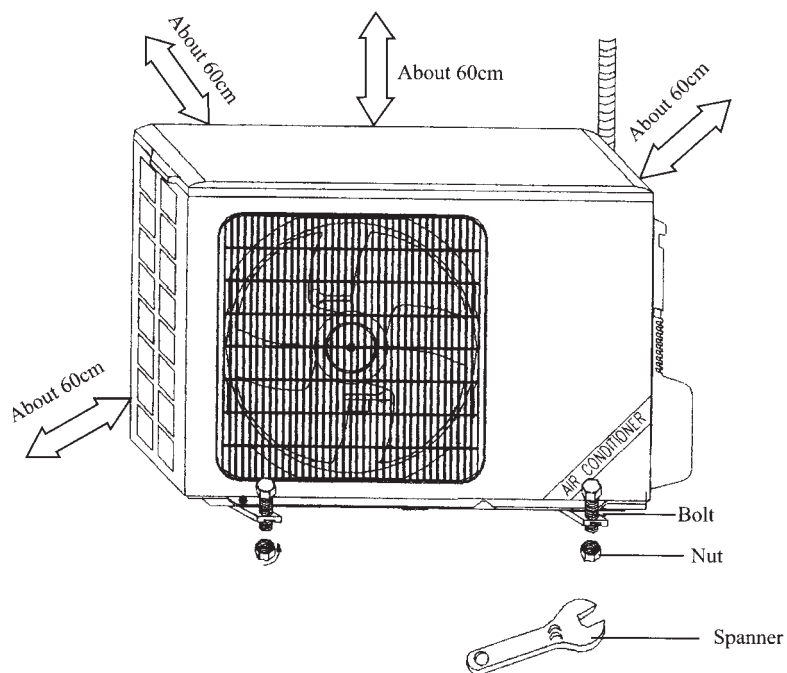
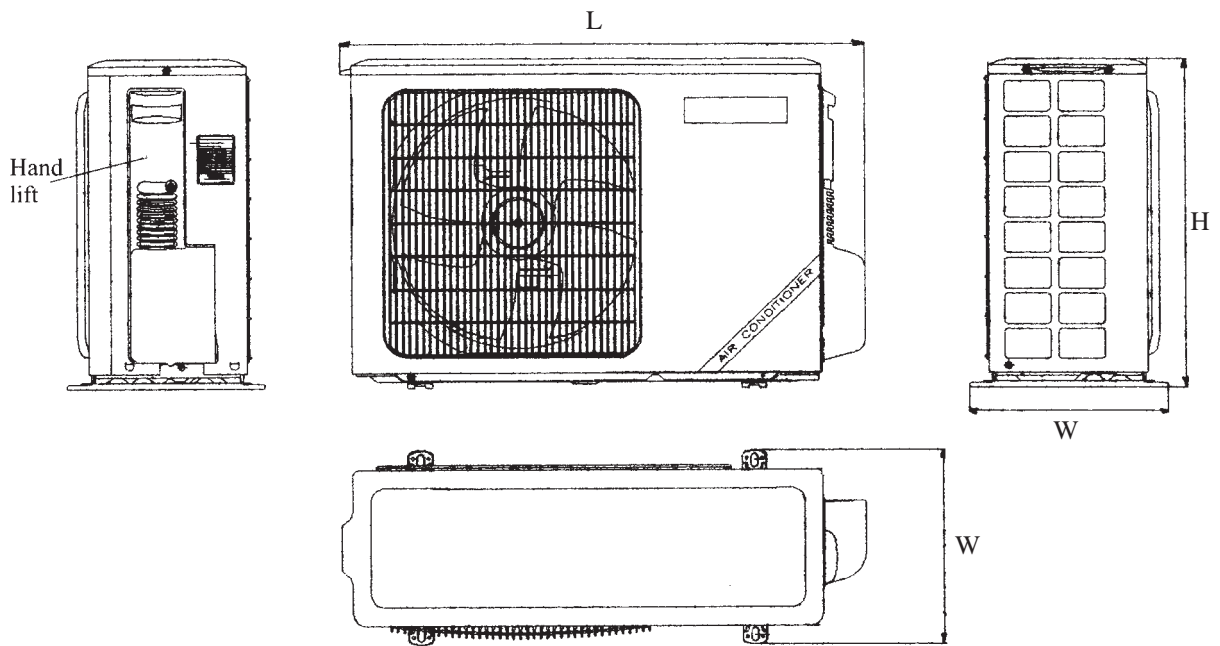
Ceiling



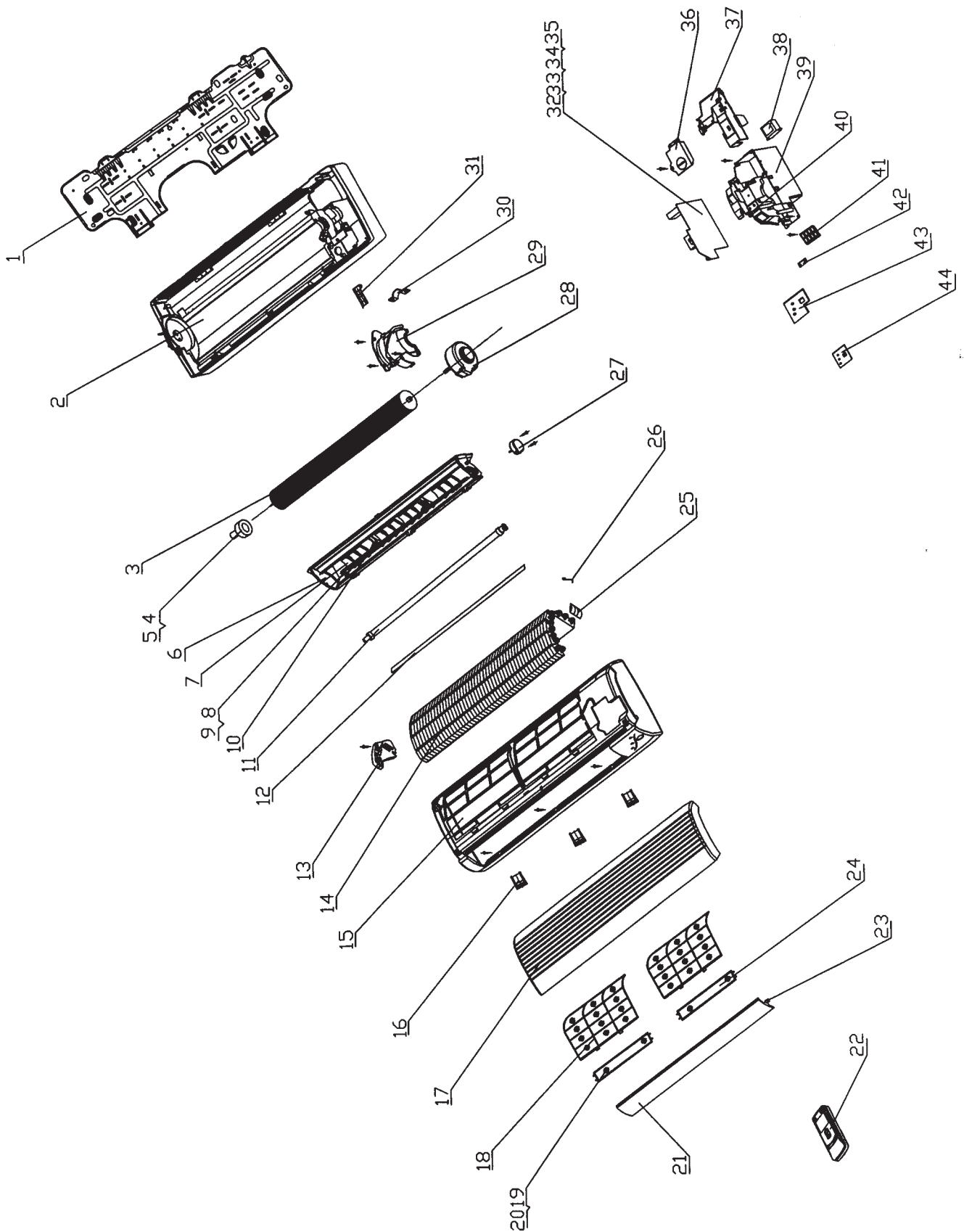
Wall-mounted frame

### 4.5 Outlines and dimensions of outdoor unit

| Model           | L X H X W       |
|-----------------|-----------------|
| KF-25GW/A12F    | 848 X 540 X 320 |
| KF-32GW/A12F    |                 |
| KFR-25X2GW/A12F |                 |
| KFR-25X3GW/A12F | 950 X 700 X 412 |
| KFR-18X4GW/A12F | 950 X 840 X 420 |



### 4.6 Explosive view and spare parts list of indoor unit





## Bird Series

Table 4-5

| No. | Description           |             | Part No.     |              | Qty |
|-----|-----------------------|-------------|--------------|--------------|-----|
|     |                       |             | KFR-25G/A12F | KFR-32G/A12F |     |
| 1   | Wall-Mouting Frame    | 壁挂板         | 01252438     | 01252438     | 1   |
| 2   | Rear Case             | 底壳          | 22202001     | 22202001     | 1   |
| 3   | Cross Flow Fan        | 贯流风叶        | 10352001     | 10352001     | 1   |
| 4   | Fan Bearing           | 风扇轴承        | 76512210     | 76512210     | 1   |
| 5   | Ring of Bearing       | 贯流风叶轴承胶圈    | 76512203     | 76512203     | 1   |
| 6   | Water Tray Assy       | 接水盘部件       | 20182012     | 20182012     | 1   |
| 7   | Swing Louver          | 扫风叶片        | 10512002     | 10512002     | 12  |
| 8   | Connecting Lever 1    | 扫风连杆 1      | 10582002     | 10582002     | 1   |
| 9   | Connecting Lever 2    | 扫风连杆 2      | 10582003     | 10582003     | 1   |
| 10  | Manual Lever          | 拔杠          | 10582001     | 10582001     | 2   |
| 11  | Drainage Pipe         | 排水管         | 05232411     | 05232411     | 1   |
| 12  | Evaporator Gate       | 蒸发器引水板      | 01094001     | 01094001     | 1   |
| 13  | Evaporator Gate       | 蒸发器角形架      | 24212001     | 24212001     | 1   |
| 14  | Evaporator Assy       | 蒸发器部件       | 010020071    | 01002007     | 1   |
| 15  | Front Case Assy       | 面板体部件       | 20002111     | 20002111     | 1   |
| 16  | Screw Cover           | 螺钉盖         | 24252001     | 24252001     | 3   |
| 17  | Front Panel           | 面板          | 20002001     | 20002001     | 1   |
| 18  | Filter                | 过滤网         | 11122002     | 11122002     | 2   |
| 19  | Air Cleaner holder    | 净化器支架       | 24222001     | 24222001     | 2   |
| 20  | Air Cleaner A         | 净化器滤网 A     | 11012002     | 11012002     | 1   |
| 21  | Guide Louver          | 导风板         | 10512001     | 10512001     | 1   |
| 22  | Remote Controller     | 遥控器 Y512    | 30512505     | 30512505     | 1   |
| 23  | Guide Louver Bearing  | 导风板轴套       | 10542011     | 10542011     | 3   |
| 24  | Air Cleaner B         | 净化器滤网 B     | 11012003     | 11012003     | 1   |
| 25  | Evaporator Pipe Cover | 蒸发器接水槽      | 06122001     | 06122001     | 1   |
| 26  | Sensor Insert         | 感温头插片 B     | 42020063     | 42020063     | 1   |
| 27  | Stepping Motor MP24GA | 步进电机 MP24GA | 15212102     | 15212102     | 1   |
| 28  | Motor Fan FN14C       | 电机 FN14C    | 15012501     | \            | 1   |
|     | Motor Fan FN14D       | 电机 FN14D    | \            | 15012059     | 1   |
| 29  | Motor Clamp           | 电机压板        | 26112014     | 26112014     | 1   |
| 30  | Wire Clamp            | 电线夹         | 71010103     | 71010103     | 1   |
| 31  | Pipe Clamp            | 连接管压板       | 24242001     | 24242001     | 1   |
| 32  | PCB 9252DJ            | 控制器 9252DJ  | 30029219     | 30029219     | 1   |
| 33  | Tube Sensor           | 管温感温包       | 39000159     | 39000159     | 1   |
| 34  | Room Sensor           | 室温感温包       | 39000155     | 39000155     | 1   |
| 35  | Fuse 3.15A 250VAC     | 保险管         | 46010014     | 46010014     | 1   |
| 36  | Electric Box Cover 2  | 电器盒顶盖 2     | 01412007     | 01412007     | 1   |
| 37  | Electric Box Cover 1  | 电器盒顶盖 1     | 20102431     | 20102431     | 1   |
| 38  | Transformer           | 电源变压器       | 43110170     | 43110170     | 1   |
| 39  | Electric Box          | 电器盒         | 20102001     | 20102001     | 1   |
| 40  | Cable Clamp           | 压线槽         | 70482001     | 70482001     | 1   |
| 41  | Terminal Board        | 接线板         | 42010184     | 42010184     | 1   |
| 42  | Wire Clip             | 压线片         | 42012415     | 42012415     | 1   |
| 43  | LED Holder            | 指示灯架        | 24212005     | 24212005     | 1   |
| 44  | LED Board JD          | 接收板 JD      | 30046034     | 30046034     | 1   |
| 45  | Connecting Cable      | 电源连接线       | 40020244     | 40020244     | 1   |
| 46  | Power Cord            | 电源线         | 40020202     | 40020203     | 1   |

The technical data are subject to change without notice.

## Bird Series

Table 4-6

| No. | Description           |             | Part No.           |                    | Qty |
|-----|-----------------------|-------------|--------------------|--------------------|-----|
|     |                       |             | KFR-25x2G/A12F(A)* | KFR-25x2G/A12F(B)* |     |
| 1   | Wall-MoutingFrame     | 壁挂板         | 01252438           | 01252438           | 1   |
| 2   | Rear Case             | 底壳          | 22202002           | 22202002           | 1   |
| 3   | Cross Flow Fan        | 贯流风叶        | 10352001           | 10352001           | 1   |
| 4   | Fan Bearing           | 风扇轴承        | 76512210           | 76512210           | 1   |
| 5   | Ring of Bearing       | 贯流风叶轴承胶圈    | 76512203           | 76512203           | 1   |
| 6   | Water Tray Assy       | 接水盘部件       | 20182012           | 20182012           | 1   |
| 7   | Swing Louver          | 扫风叶片        | 10512002           | 10512002           | 12  |
| 8   | Connecting Lever 1    | 扫风连杠 1      | 10582002           | 10582002           | 1   |
| 9   | Connecting Lever 2    | 扫风连杠 2      | 10582003           | 10582003           | 1   |
| 10  | Manual Lever          | 拔杠          | 10582001           | 10582001           | 2   |
| 11  | Drainage Pipe         | 排水管         | 05232411           | 05232411           | 1   |
| 12  | Evaporator Gate       | 蒸发器引水板      | 01094001           | 01094001           | 1   |
| 13  | Evaporator Gate       | 蒸发器角形架      | 24212001           | 24212001           | 1   |
| 14  | Evaporator Assy       | 蒸发器部件       | 01002007           | 01002007           | 1   |
| 15  | Front Case Assy       | 面板体部件       | 20002116           | 20002116           | 1   |
| 16  | Screw Cover           | 螺钉盖         | 24252001           | 24252001           | 3   |
| 17  | Front Panel           | 面板          | 20002001           | 20002001           | 1   |
| 18  | Filter                | 过滤网         | 11122002           | 11122002           | 2   |
| 19  | Air Cleaner holder    | 净化器支架       | 24222001           | 24222001           | 2   |
| 20  | Air Cleaner A         | 净化器滤网 A     | 11012002           | 11012002           | 1   |
| 21  | Guide Louver          | 导风板         | 10512001           | 10512001           | 1   |
| 22  | Remote Controller     | 遥控器 Y512    | 30512506           | 30512506           | 1   |
| 23  | Guide Louver Bearing  | 导风板轴套       | 10542011           | 10542011           | 3   |
| 24  | Air Cleaner B         | 净化器滤网 B     | 11012003           | 11012003           | 1   |
| 25  | Evaporator Pipe Cover | 蒸发器接水槽      | 06122001           | 06122001           | 1   |
| 26  | Sensor Insert         | 感温头插片 B     | 42020063           | 42020063           | 1   |
| 27  | Stepping Motor MP24GA | 步进电机 MP24GA | 15212102           | 15212102           | 1   |
| 28  | Motor Fan FN14D       | 电机 FN14D    | 15012059           | 15012059           | 1   |
| 29  | Motor Clamp           | 电机压板        | 26112014           | 26112014           | 1   |
| 30  | Wire Clamp            | 电线夹         | 71010103           | 71010103           | 1   |
| 31  | Pipe Clamp            | 连接管压板       | 24242001           | 24242001           | 1   |
| 32  | PCB 9652CA            | 控制器 9652CA  | 30029604           | 30029604           | 1   |
| 33  | Tube Sensor           | 管温感温包       | 39000159           | 39000159           | 1   |
| 34  | Room Sensor           | 室温感温包       | 39000155           | 39000155           | 1   |
| 35  | Fuse 3.15A 250VAC     | 保险管         | 46010014           | 46010014           | 1   |
| 36  | Electric Box Cover 2  | 电器盒顶盖 2     | 01412007           | 01412007           | 1   |
| 37  | Electric Box Cover 1  | 电器盒顶盖 1     | 20102006           | 20102006           | 1   |
| 38  | Transformer           | 电源变压器       | 43110170           | 43110170           | 1   |
| 39  | Electric Box          | 电器盒         | 20102001           | 20102001           | 1   |
| 40  | Cable Clamp           | 压线槽         | 70482001           | 70482001           | 1   |
| 41  | Terminal Board        | 接线板 GT4B3A2 | 42010184           | 42010184           | 1   |
| 42  | Wire Clip             | 压线片         | 42012415           | 42012415           | 1   |
| 43  | LEDHolder             | 指示灯架        | 24212005           | 24212005           | 1   |
| 44  | LED Board JD          | 接收板 JD      | 30046034           | 30046034           | 1   |
| 45  | Connecting Cable      | 电源连接线       | 40020441           | 40020441           | 1   |
| 46  | Power Cord            | 电源线         | 40020318           | \                  | 1   |

The technical data are subject to change without notice.

\* Unit A and B are specified in circuit diagram.

## Bird Series

Table 4-7

| No. | Description           |             | Part No.           |                      | Qty |
|-----|-----------------------|-------------|--------------------|----------------------|-----|
|     |                       |             | KFR-25x3G/A12F(A)* | KFR-25x3G/A12F(B&C)* |     |
| 1   | Wall-Mouting Frame    | 壁挂板         | 01252438           | 01252438             | 1   |
| 2   | Rear Case             | 底壳          | 22202002           | 22202002             | 1   |
| 3   | Cross Flow Fan        | 贯流风叶        | 10352001           | 10352001             | 1   |
| 4   | Fan Bearing           | 风扇轴承        | 76512210           | 76512210             | 1   |
| 5   | Ring of Bearing       | 贯流风叶轴承胶圈    | 76512203           | 76512203             | 1   |
| 6   | Water Tray Assy       | 接水盘部件       | 20182012           | 20182012             | 1   |
| 7   | Swing Louver          | 扫风叶片        | 10512002           | 10512002             | 12  |
| 8   | Connecting Lever 1    | 扫风连杠 1      | 10582002           | 10582002             | 1   |
| 9   | Connecting Lever 2    | 扫风连杠 2      | 10582003           | 10582003             | 1   |
| 10  | Manual Lever          | 拔杠          | 10582001           | 10582001             | 2   |
| 11  | Drainage Pipe         | 排水管         | 05232411           | 05232411             | 1   |
| 12  | Evaporator Gate       | 蒸发器引水板      | 26112022           | 26112022             | 1   |
| 13  | Evaporator Gate       | 蒸发器角形架      | 24212001           | 24212001             | 1   |
| 14  | Evaporator Assy       | 蒸发器部件       | 01002007           | 01002007             | 1   |
| 15  | Front Case Assy       | 面板体部件       | 20002116           | 20002116             | 1   |
| 16  | Screw Cover           | 螺钉盖         | 24252001           | 24252001             | 3   |
| 17  | Front Panel           | 面板          | 20002001           | 20002001             | 1   |
| 18  | Filter                | 过滤网         | 11122002           | 11122002             | 2   |
| 19  | Air Cleaner holder    | 净化器支架       | 24222001           | 24222001             | 2   |
| 20  | Air Cleaner A         | 净化器滤网 A     | 11012002           | 11012002             | 1   |
| 21  | Guide Louver          | 导风板         | 10512001           | 10512001             | 1   |
| 22  | Remote Controller     | 遥控器 Y512    | 30512506           | 30512506             | 1   |
| 23  | Guide Louver Bearing  | 导风板轴套       | 10542011           | 10542011             | 3   |
| 24  | Air Cleaner B         | 净化器滤网 B     | 11012003           | 11012003             | 1   |
| 25  | Evaporator Pipe Cover | 蒸发器接水槽      | 06122001           | 06122001             | 1   |
| 26  | Sensor Insert         | 感温头插片 B     | 42020063           | 42020063             | 1   |
| 27  | Stepping Motor MP24GA | 步进电机 MP24GA | 15212102           | 15212102             | 1   |
| 28  | Motor Fan FN14D       | 电机 FN14D    | 15012059           | 15012059             | 1   |
| 29  | Motor Clamp           | 电机压板        | 26112014           | 26112014             | 1   |
| 30  | Wire Clamp            | 电线夹         | 71010103           | 71010103             | 1   |
| 31  | Pipe Clamp            | 连接管压板       | 24242001           | 24242001             | 1   |
| 32  | PCB 9652CA            | 控制器 9652CA  | 30029604           | 30029604             | 1   |
| 33  | Tube Sensor           | 管温感温包       | 39000159           | 39000159             | 1   |
| 34  | Room Sensor           | 室温感温包       | 39000155           | 39000155             | 1   |
| 35  | Fuse 3.15A 250VAC     | 保险管         | 46010014           | 46010014             | 1   |
| 36  | Electric Box Cover 2  | 电器盒顶盖 2     | 01412007           | 01412007             | 1   |
| 37  | Electric Box Cover 1  | 电器盒顶盖 1     | 20102006           | 20102006             | 1   |
| 38  | Transformer           | 电源变压器       | 43110170           | 43110170             | 1   |
| 39  | Electric Box          | 电器盒         | 20102001           | 20102001             | 1   |
| 40  | Cable Clamp           | 压线槽         | 70482001           | 70482001             | 1   |
| 41  | Terminal Board        | 接线板 GT4B3A2 | 42010184           | 42010184             | 1   |
| 42  | Wire Clip             | 压线片         | 42012415           | 42012415             | 1   |
| 43  | LED Holder            | 指示灯架        | 24212005           | 24212005             | 1   |
| 44  | LED Board JD          | 接收板 JD      | 30046034           | 30046034             | 1   |
| 45  | Connecting Cable      | 电源连接线       | 40020441           | 40020441             | 1   |
| 46  | Power Cord            | 电源线         | 40020318           | \                    | 1   |

The technical data are subject to change without notice.

\* Unit A,B and C are specified in circuit diagram.

## Bird Series

Table 4-8

| No. | Description           |             | Part No.           |                        | Qty |
|-----|-----------------------|-------------|--------------------|------------------------|-----|
|     |                       |             | KFR-18x4G/A12F(A)* | KFR-18x4G/A12F(B,C&D)* |     |
| 1   | Wall-MoutingFrame     | 壁挂板         | 01252438           | 01252438               | 1   |
| 2   | Rear Case             | 底壳          | 22202002           | 22202002               | 1   |
| 3   | Cross Flow Fan        | 贯流风叶        | 10352001           | 10352001               | 1   |
| 4   | Fan Bearing           | 风扇轴承        | 76512210           | 76512210               | 1   |
| 5   | Ring of Bearing       | 贯流风叶轴承胶圈    | 76512203           | 76512203               | 1   |
| 6   | Water Tray Assy       | 接水盘部件       | 20182012           | 20182012               | 1   |
| 7   | Swing Louver          | 扫风叶片        | 10512002           | 10512002               | 12  |
| 8   | Connecting Lever 1    | 扫风连杠 1      | 10582002           | 10582002               | 1   |
| 9   | Connecting Lever 2    | 扫风连杠 2      | 10582003           | 10582003               | 1   |
| 10  | Manual Lever          | 拔杠          | 10582001           | 10582001               | 2   |
| 11  | Drainage Pipe         | 排水管         | 05232411           | 05232411               | 1   |
| 12  | Evaporator Gate       | 蒸发器引水板      | 01094001           | 01094001               | 1   |
| 13  | Evaporator Gate       | 蒸发器角形架      | 24212001           | 24212001               | 1   |
| 14  | Evaporator Assy       | 蒸发器部件       | 01002007           | 01002007               | 1   |
| 15  | Front Case Assy       | 面板体部件       | 20002116           | 20002116               | 1   |
| 16  | Screw Cover           | 螺钉盖         | 24252001           | 24252001               | 3   |
| 17  | Front Panel           | 面板          | 20002001           | 20002001               | 1   |
| 18  | Filter                | 过滤网         | 11122002           | 11122002               | 2   |
| 19  | Air Cleaner holder    | 净化器支架       | 24222001           | 24222001               | 2   |
| 20  | Air Cleaner A         | 净化器滤网 A     | 11012002           | 11012002               | 1   |
| 21  | Guide Louver          | 导风板         | 10512001           | 10512001               | 1   |
| 22  | Remote Controller     | 遥控器 Y512    | 30512506           | 30512506               | 1   |
| 23  | Guide Louver Bearing  | 导风板轴套       | 10542011           | 10542011               | 3   |
| 24  | Air Cleaner B         | 净化器滤网 B     | 11012003           | 11012003               | 1   |
| 25  | Evaporator Pipe Cover | 蒸发器接水槽      | 06122001           | 06122001               | 1   |
| 26  | Sensor Insert         | 感温头插片 B     | 42020063           | 42020063               | 1   |
| 27  | Stepping Motor MP24GA | 步进电机 MP24GA | 15212102           | 15212102               | 1   |
| 28  | Motor Fan FN14C       | 电机 FN14C    | 15012501           | 15012501               | 1   |
| 29  | Motor Clamp           | 电机压板        | 26112014           | 26112014               | 1   |
| 30  | Wire Clamp            | 电线夹         | 71010103           | 71010103               | 1   |
| 31  | Pipe Clamp            | 连接管压板       | 24242001           | 24242001               | 1   |
| 32  | PCB 9652CA            | 控制器 9652CA  | 30029604           | 30029604               | 1   |
| 33  | Tube Sensor           | 管温感温包       | 39000159           | 39000159               | 1   |
| 34  | Room Sensor           | 室温感温包       | 39000155           | 39000155               | 1   |
| 35  | Fuse 3.15A 250VAC     | 保险管         | 46010014           | 46010014               | 1   |
| 36  | Electric Box Cover 2  | 电器盒顶盖 2     | 01412007           | 01412007               | 1   |
| 37  | Electric Box Cover 1  | 电器盒顶盖 1     | 20102006           | 20102006               | 1   |
| 38  | Transformer           | 电源变压器       | 43110170           | 43110170               | 1   |
| 39  | Electric Box          | 电器盒         | 20102001           | 20102001               | 1   |
| 40  | Cable Clamp           | 压线槽         | 70482001           | 70482001               | 1   |
| 41  | Terminal Board        | 接线板 GT4B3A2 | 42010184           | 42010184               | 1   |
| 42  | Wire Clip             | 压线片         | 42012415           | 42012415               | 1   |
| 43  | LEDHolder             | 指示灯架        | 24212005           | 24212005               | 1   |
| 44  | LED Board JD          | 接收板 JD      | 30046034           | 30046034               | 1   |
| 45  | Connecting Cable      | 电源连接线       | 40020441           | 40020441               | 1   |
| 46  | Power Cord            | 电源线         | 40020318           | \                      | 1   |

The technical data are subject to change without notice.

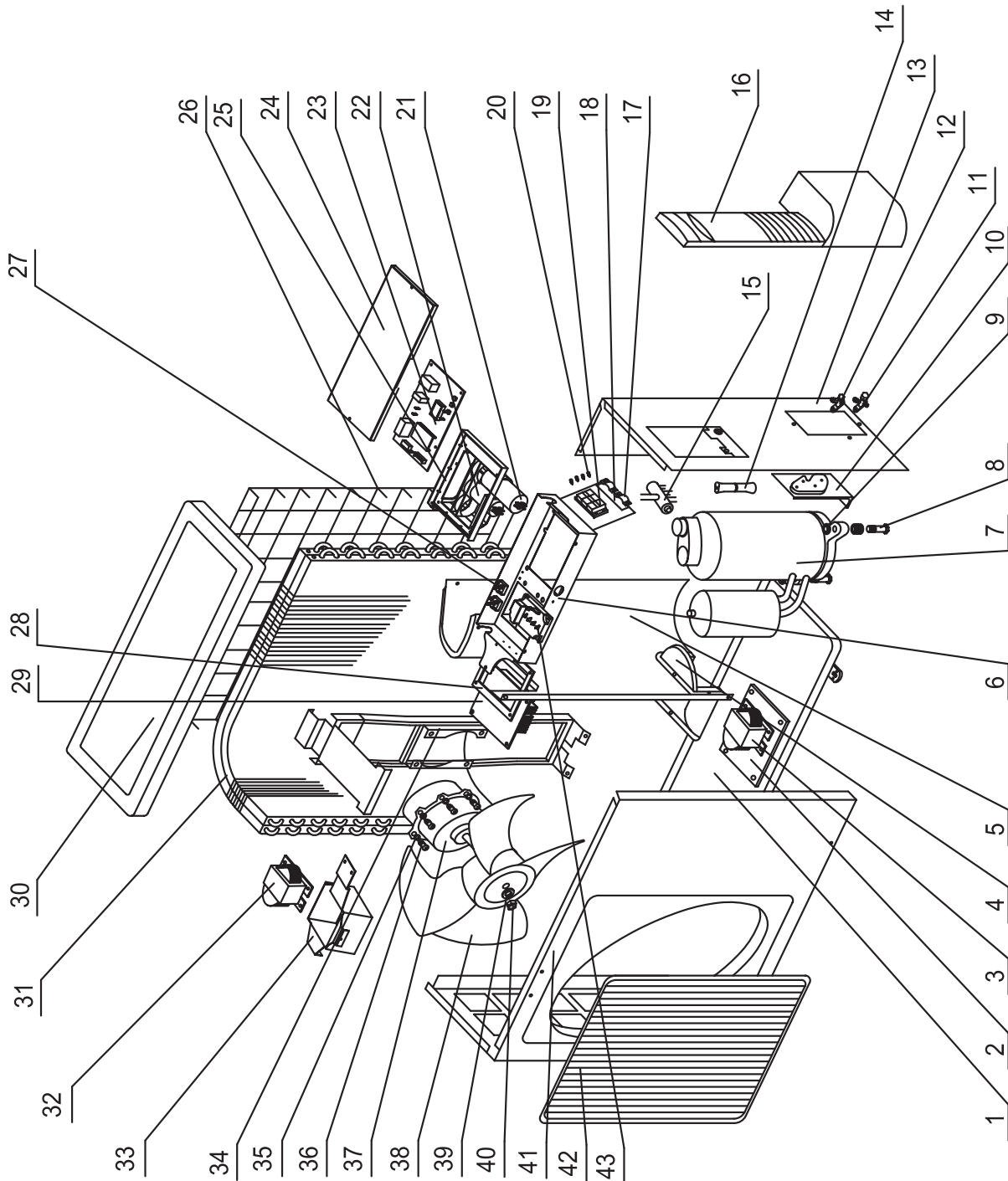
\* Unit A,B,C and D are specified in circuit diagram.

(Blank)

### 4.7 Explosive view and spare parts list of outdoor unit

Model: KFR-25GW/A12F

KFR-32GW/A12F



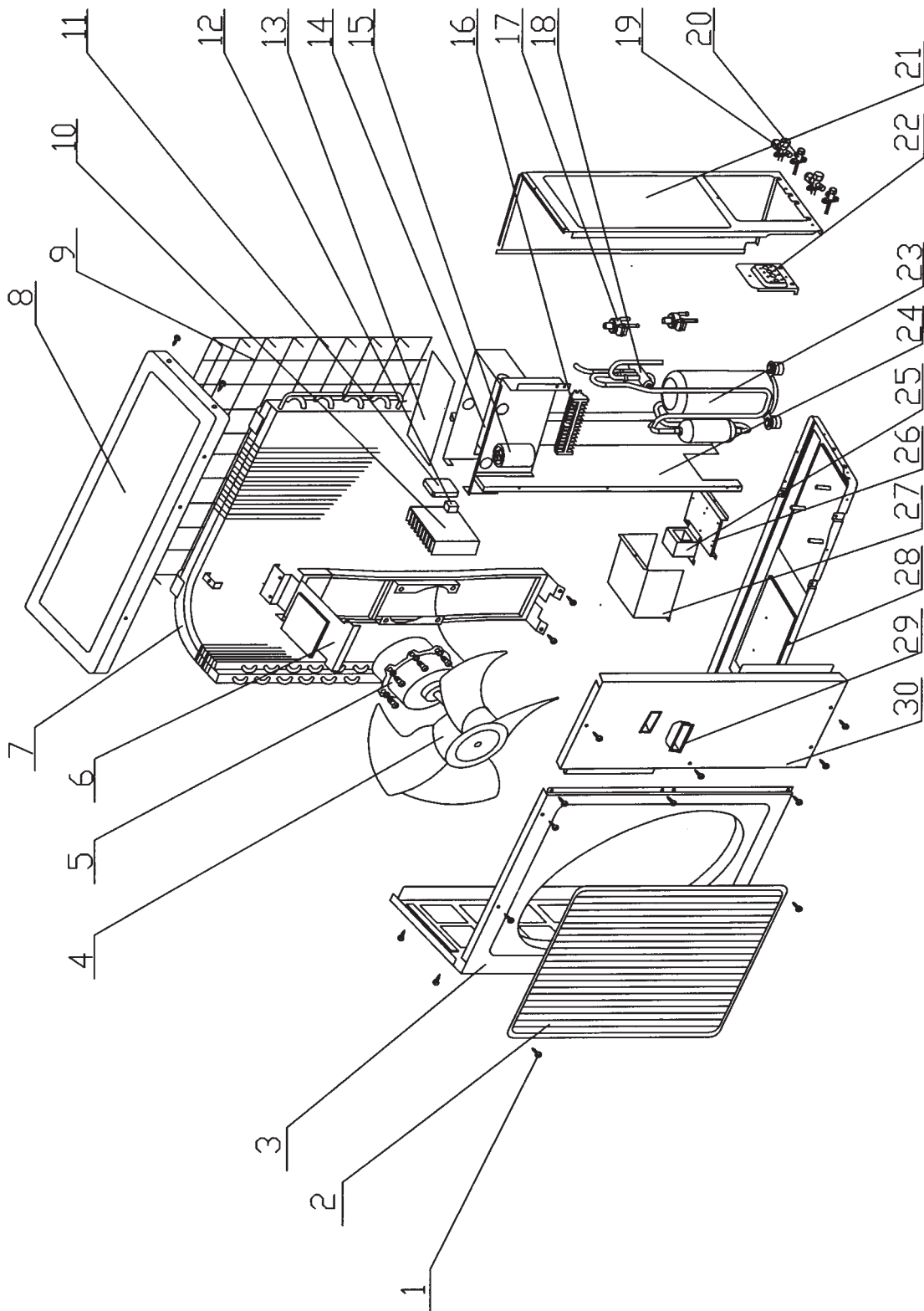
## Bird Series

Table 4-9

| No. | Description              | Part No.              |              | Qty      |   |
|-----|--------------------------|-----------------------|--------------|----------|---|
|     |                          | KFR-25W/A12F          | KFR-32W/A12F |          |   |
| 1   | Metal Base               | 底盘组件                  | 01203331     | 01203102 | 1 |
| 2   | Reactor Support          | 底板                    | 22223401     | 22223401 | 1 |
| 3   | Reactor 1                | 电抗器 1                 | 43130157     | 43130156 | 1 |
| 4   | Reactor Box              | 电抗器盒                  | 20123025     | 20123025 | 1 |
| 5   | Clapboard                | 隔板                    | 01233381     | 01233381 | 1 |
| 6   | Electric Box B           | 电器盒 B                 | 01413050     | 01413050 | 1 |
| 7   | Compressor C-1RB102H12AA | 压缩机及其附件 C-1RB102H12AA | 00100349     | \        | 1 |
|     | Compressor C-1RV73H0S    | 压缩机及其附件 C-1RV73H0S    | \            | 00120034 | 1 |
| 8   | Bolt                     | 定位螺栓                  | 70210007     | 70210007 | 3 |
| 9   | Nut                      | 带垫螺母 M6               | 70310011     | 70310011 | 3 |
| 10  | Valve Support            | 阀门支架                  | 01713041     | 01713041 | 1 |
| 11  | Valve 3/8"               | 阀门 3/8"               | 07100145     | \        | 1 |
|     | Valve 1/2"               | 阀门 1/2"               | \            | 07100151 | 1 |
| 12  | Valve 1/4"               | 阀门 1/4"               | 07100125     | 07100115 | 1 |
| 13  | Right Side Plate         | 右侧板                   | 01303048     | 01303048 | 1 |
| 14  | One Way Valve A          | 单向阀 A                 | 07130102     | 07130102 | 1 |
| 15  | 4-Way Valve              | 四通阀                   | 43000402     | 43000403 | 1 |
| 16  | Handle                   | 大提手                   | 26233433     | 26233433 | 1 |
| 17  | Wire Clap                | 电线夹                   | 71010103     | 71010103 | 1 |
| 18  | Insulation Piece C       | 绝缘垫片 C                | 70410523     | 70410523 | 1 |
| 19  | Terminal Board           | 接线板                   | 42011241     | 42011241 | 1 |
| 20  | Screw                    | 螺钉组合件                 | 70110225     | 70110225 | 4 |
| 21  | Capacitor 2              | 电容 2                  | 33010154     | 33010157 | 1 |
| 22  | Capacitor 1              | 电容 1                  | 33310054     | 33010739 | 1 |
| 23  | PCB W952C                | 控制器 W952C             | 30029044     | \        | 1 |
|     | PCB W952D                | 控制器 W952D             | \            | 30029045 | 1 |
| 24  | Electric Box Cover       | 电器盒盖                  | 01413048     | 01413048 | 1 |
| 25  | Electric Box A           | 电器盒 A                 | 20103501     | 20103501 | 1 |
| 26  | Rear Grill Assy          | 后护网组件                 | 11123402     | 11123402 | 1 |
| 27  | Rectifier                | 整流桥                   | 46010601     | 46010602 | 2 |
| 28  | Module Support           | 模块支架                  | 24213025     | 24213025 | 1 |
| 29  | Radiator                 | 散热器                   | 49010212     | 49010212 | 1 |
| 30  | Top Cover Assy           | 顶盖组件                  | 01253260     | 01253260 | 1 |
| 31  | Condenser Assy           | 冷凝器组件                 | 01103510     | 01103510 | 1 |
| 32  | Reactor 2                | 电抗器 2                 | 43130166     | 43130165 | 1 |
| 33  | Reactor Box 2            | 电抗器盒 2                | 01413502     | 01413503 | 1 |
| 34  | Motor Support            | 电机支架                  | 01703067     | 01703067 | 1 |
| 35  | Washer                   | 垫圈片 5                 | 70410242     | 70410242 | 4 |
| 36  | Self-tapping Screw       | 自攻螺钉                  | 70140367     | 70140367 | 4 |
| 37  | Motor                    | 电机                    | 15013501     | 15013501 | 1 |
| 38  | Axial Flow Fan           | 轴流风叶                  | 10333412     | 10333412 | 1 |
| 39  | Washer                   | 垫圈 6                  | 70410252     | 70410252 | 1 |
| 40  | Nut                      | 螺母                    | 70310121     | 70310121 | 1 |
| 41  | Front Plate              | 面板                    | 01533428     | 01533428 | 1 |
| 42  | Front Grill              | 面板格栅                  | 22413431     | 22413431 | 1 |
| 43  | Power Module             | 电源模块                  | 32210082     | 32210084 | 1 |

The technical data are subject to change without notice .

Model: KFR-25X2GW/A12F





## Bird Series

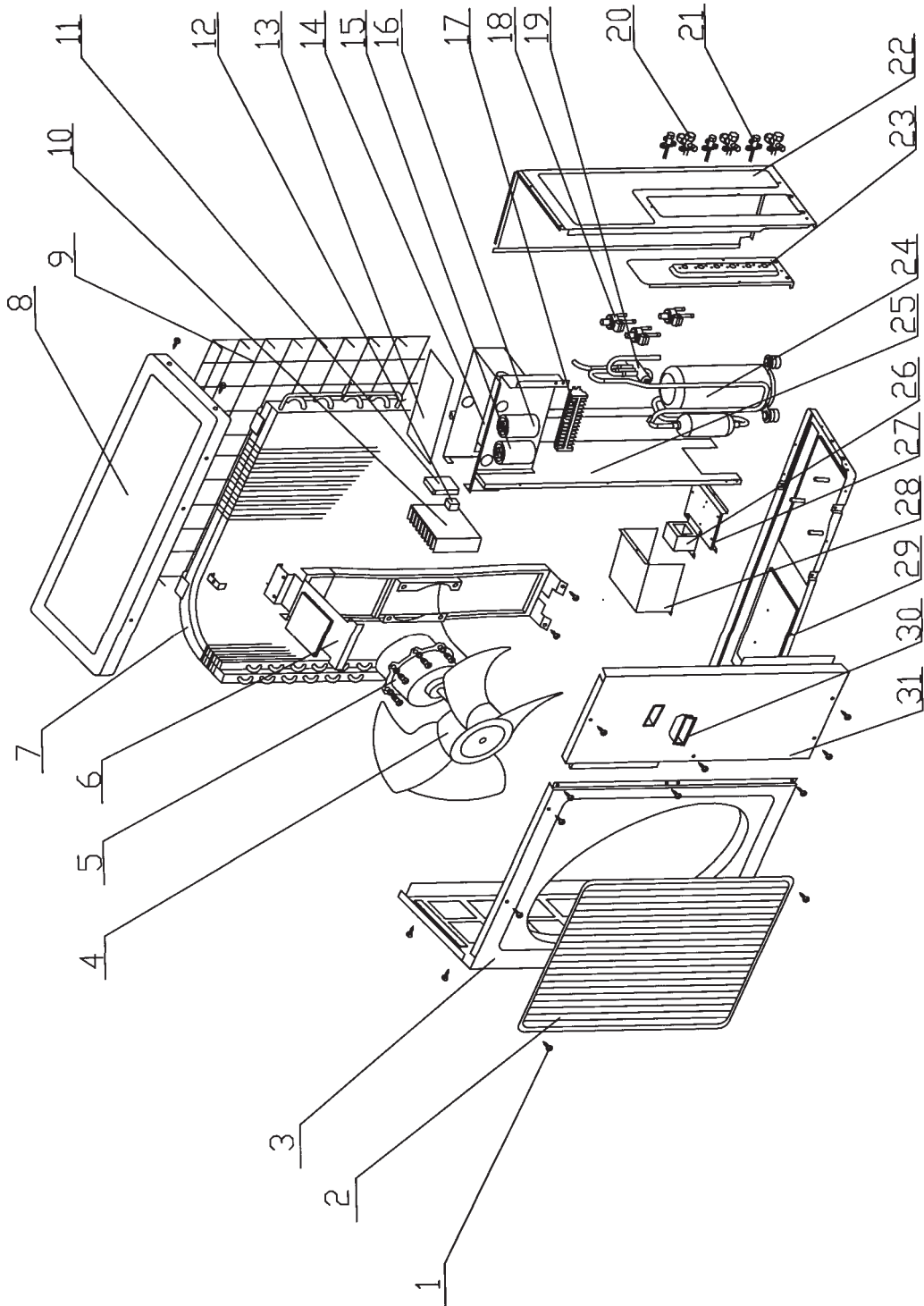
Table 4-10

| No. | Description                         |                         | Part No.       | Qty |
|-----|-------------------------------------|-------------------------|----------------|-----|
|     |                                     |                         | KFR-25X2W/A12F |     |
| 1   | Self-tapping Screw                  | 螺钉                      | 70140551       | 46  |
| 2   | Front Grill                         | 面罩组件                    | 22265250       | 1   |
| 3   | Front Plate                         | 外罩                      | 01433031       | 1   |
| 4   | Axial Flow Fan                      | 轴流风叶                    | 10335257       | 1   |
| 5   | Motor FW60R                         | 电机FW60R                 | 15013705       | 1   |
| 6   | Motor Support                       | 电机支架                    | 01703027       | 1   |
| 7   | Condenser Assy                      | 冷凝器组件                   | 01135021       | 1   |
| 8   | Top Cover Assy                      | 顶盖组件                    | 01253501       | 1   |
| 9   | Rear Grill Assy                     | 网罩组件                    | 01473026       | 1   |
| 10  | Radiator                            | 散热器                     | 49010258       | 1   |
| 11  | Power Module TM-35                  | 电源模块 TM-35              | 32210083       | 1   |
| 12  | Rectifier S25VB60                   | 整流桥 S25VB60             | 46010602       | 1   |
| 13  | PCB W502A                           | 控制器 W502A               | 30025596       | 1   |
| 14  | Electric Box                        | 电器盒                     | 01413501       | 1   |
| 15  | Capacitor CBB65 35uF/450V           | 电容 CBB65 35uF/450V      | 33010739       | 1   |
| 16  | Terminal Board                      | 八位接线板                   | 420100031      | 1   |
| 17  | Electronic Expansion Valve SEV18RC3 | 电子膨胀阀 SEV18RC3          | 44010198       | 2   |
| 18  | 4-Way Valve                         | 四通阀STF-0202/DHF-3/SHF-7 | 43000313       | 1   |
| 19  | Valve 1/4"                          | 阀门 1/4"                 | 07100017       | 2   |
| 20  | Valve 3/8"                          | 阀门 3/8"                 | 07100018       | 2   |
| 21  | Rear Side Plate                     | 后侧板组件                   | 01303021       | 1   |
| 22  | Valve Support                       | 阀门支架                    | 01713028       | 1   |
| 23  | Compressor QXB-23(F)                | 压缩机及其配件 QXB-23(F)       | 00100408       | 1   |
| 24  | Isolation Sheet Assy                | 中间隔板组件                  | 01235013       | 1   |
| 25  | Reactor 9mH,18A                     | 电抗器 9mH,18A             | 43130160       | 1   |
| 26  | Reactor Support                     | 电抗器支架                   | 01413056       | 1   |
| 27  | Reactor Boc                         | 电抗器盒                    | 01413055       | 1   |
| 28  | Metal Base                          | 底盘组件                    | 01203508       | 1   |
| 29  | Handle                              | 把手                      | 26235253       | 1   |
| 30  | Front Side Plate                    | 前侧板组件                   | 01303019       | 1   |

The data are subject to change without notice.

Bird Series

Model: KFR-25X3GW/A12F



## Bird Series

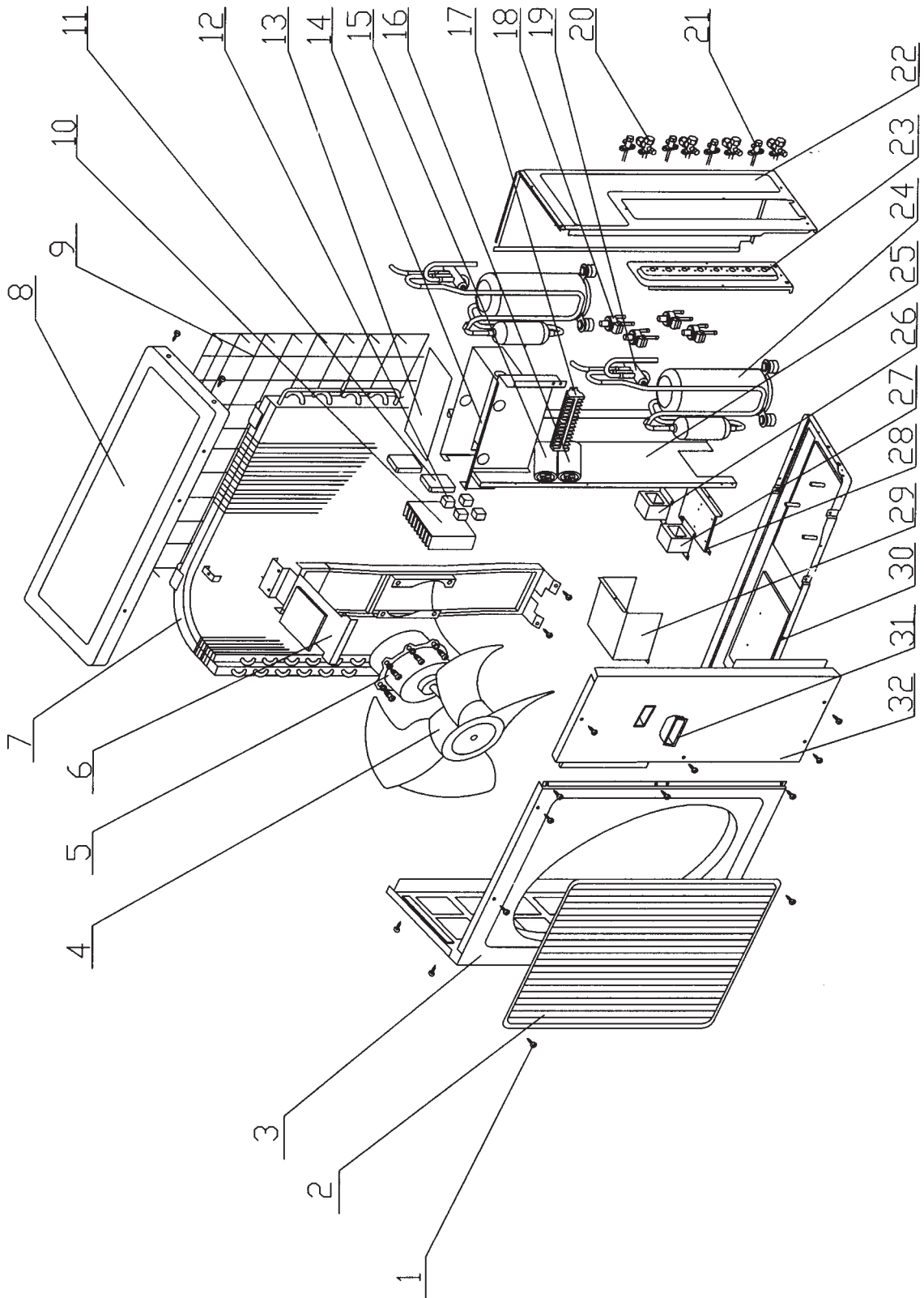
Table 4-11

| No. | Description                |                    | Part No.       | Qty |
|-----|----------------------------|--------------------|----------------|-----|
|     |                            |                    | KFR-25X3W/A12F |     |
| 1   | Self-tapping Screw         | 螺钉                 | 70140164       | 46  |
| 2   | Front Grill                | 面罩                 | 22265251       | 1   |
| 3   | Front Plate                | 外罩                 | 01435254       | 1   |
| 4   | Axial Flow Fan             | 轴流风叶               | 10335253       | 1   |
| 5   | Motor FW60K                | 电机 FW60K           | 15013502       | 1   |
| 6   | Motor Support              | 电机支架               | 01705253       | 1   |
| 7   | Condenser Assy             | 冷凝器组件              | 011350341      | 1   |
| 8   | Top Cover Assy             | 顶盖组件               | 01253501       | 1   |
| 9   | Rear Grill                 | 网罩                 | 01475251       | 1   |
| 10  | Radiator                   | 模块散热器              | 49015501       | 1   |
| 11  | Power Module TM35          | 电源模块 TM35          | 32210083       | 1   |
| 12  | Rectifier S25VB60          | 整流桥 S25VB60        | 46010602       | 1   |
| 13  | PCB W502A                  | 控制器 W502A          | 30025576       | 1   |
| 14  | Electric Box               | 电器盒                | 01413501       | 1   |
| 15  | Capacitor CBB65 35uF/450V  | 电容 CBB65 35uF/450V | 33010739       | 1   |
| 16  | Capacitor 3300uF/400V      | 电容 3300uF/400V     | 33010804       | 1   |
| 17  | Terminal Board             | 接线板                | 420112061      | 1   |
| 18  | Electronic Expansion Valve | 电子膨胀阀              | 07133502       | 1   |
| 19  | 4-Way Valve                | 四通阀                | 43000403       | 1   |
|     | 4-Way Valve Fittings       | 四通阀配件              | 430004001      | 1   |
| 20  | Valve 1/4"                 | 阀门 1/4"            | 07103020       | 3   |
| 21  | Valve 3/8"                 | 阀门 3/8"            | 07103021       | 3   |
| 22  | Rear Side Plate            | 后侧板                | 01303049       | 1   |
| 23  | Valve Support              | 阀门支架               | 01713040       | 1   |
| 24  | Compressor QXBS-26(F)      | 压缩机及其配件 QXBS-26(F) | 00100411       | 1   |
| 25  | Isolation Sheet            | 中间隔板               | 01235571       | 1   |
| 26  | Reactor 9.0mH/22A          | 电抗器 9.0mH/22A      | 43130161       | 1   |
| 27  | Reactor Support            | 电抗器支架              | 01413056       | 1   |
| 28  | Reactor Boc                | 电抗器盒               | 01413055       | 1   |
| 29  | Metal Base                 | 底盘组件               | 01203135       | 1   |
| 30  | Handle                     | 把手                 | 26235253       | 1   |
| 31  | Front Side Plate           | 前侧板组件              | 01305018       | 1   |

The data are subject to change without notice.

Bird Series

Model: KFR-18X4GW/A12F



## Bird Series

Table 4-12

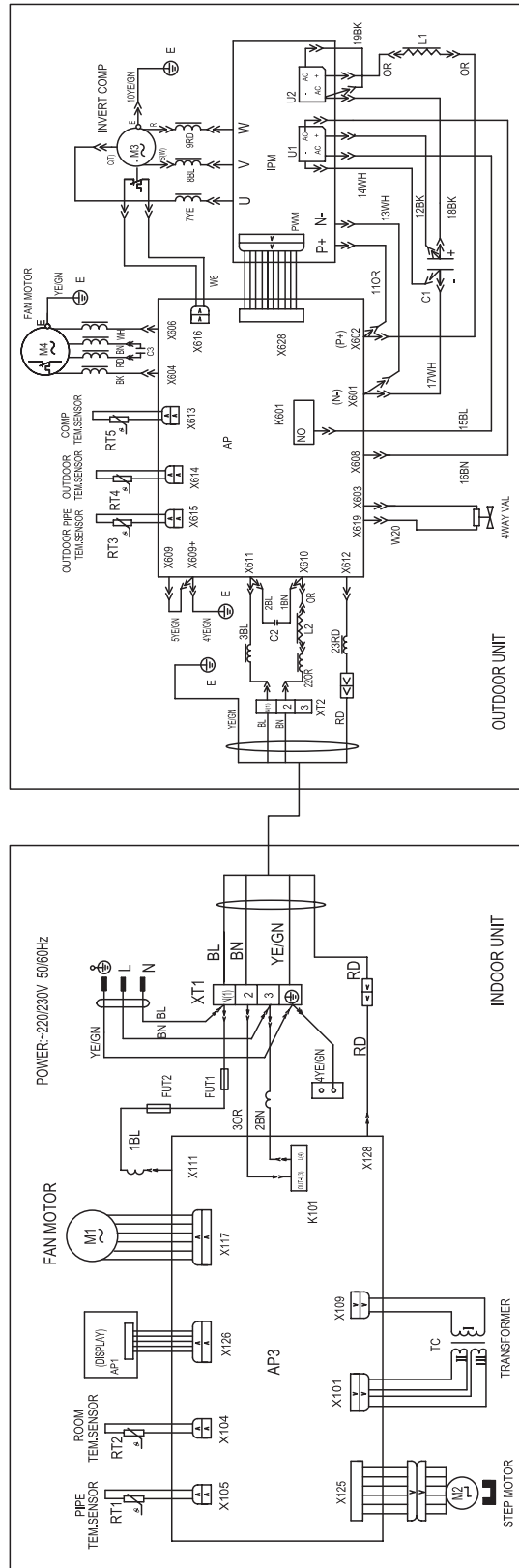
| No. | Description                |                      | Part No.       | Qty |
|-----|----------------------------|----------------------|----------------|-----|
|     |                            |                      | KFR-18X4W/A12F |     |
| 1   | Self-tapping Screw         | 螺钉                   | 70140164       | 60  |
| 2   | Front Grill                | 面罩                   | 22265251       | 1   |
| 3   | Front Plate                | 外罩                   | 01435254       | 1   |
| 4   | Axial Flow Fan             | 轴流风叶                 | 10335253       | 1   |
| 5   | Motor FW60K                | 电机 FW60K             | 15013502       | 1   |
| 6   | Motor Support              | 电机支架                 | 01705253       | 1   |
| 7   | Condenser Assy             | 冷凝器组件                | 01133054       | 1   |
| 8   | Top Cover Assy             | 顶盖组件                 | 01253501       | 1   |
| 9   | Rear Grill                 | 网罩                   | 01475251       | 1   |
| 10  | Radiator                   | 模块散热器                | 49013001       | 1   |
| 11  | Power Module TM-35         | 电源模块 TM-35           | 32210083       | 2   |
| 12  | Rectifier S25VB60          | 整流桥 S25VB60          | 46010602       | 2   |
| 13  | PCB W502B                  | 控制器 W502B            | 30025599       | 1   |
| 14  | Electric Box               | 电器盒                  | 01413057       | 1   |
| 15  | Capacitor CBB65 30uF/450V  | 电容 CBB65 30uF/450V   | 33000021       | 1   |
| 16  | Capacitor CBB65 30uF/450V  | 电容 CBB65 30uF/450V   | 33000021       | 1   |
| 17  | Terminal Board T14A        | 接线板 T14A             | 420112111      | 1   |
| 18  | Electronic Expansion Valve | 电子膨胀阀 SEV18RC3       | 44010198       | 2   |
| 19  | 4-Way Valve                | 四通阀                  | 43000403       | 1   |
|     | 4-Way Valve Fittings       | 四通阀配件                | 430004002      | 1   |
| 20  | Valve 1/4"                 | 阀门 1/4"              | 07103024       | 4   |
| 21  | Valve 3/8"                 | 阀门 3/8"              | 07103025       | 4   |
| 22  | Rear Side Plate            | 后侧板                  | 01303049       | 1   |
| 23  | Valve Support              | 阀门支架                 | 01713032       | 1   |
| 24  | Compressor C-6RV73H0H      | 压缩机及其配件 C-6RV73H0H   | 00120035       | 2   |
| 25  | Isolation Sheet Assy       | 中间隔板组件               | 01233002       | 1   |
| 26  | Reactor L0808 (10mH/13A)   | 电抗器 L0808 (10mH/13A) | 43130156       | 1   |
| 27  | Reactor L0808 (10mH/13A)   | 电抗器 L0808 (10mH/13A) | 43130156       | 1   |
| 28  | Reactor Support            | 电抗器支架                | 01413056       | 1   |
| 29  | Reactor Boc                | 电抗器盒                 | 01413055       | 1   |
| 30  | Metal Base                 | 底盘组件                 | 01203136       | 1   |
| 31  | Handle                     | 把手                   | 26235252       | 1   |
| 32  | Front Side Plate           | 前侧板组件                | 01305018       | 1   |

The data are subject to change without notice.

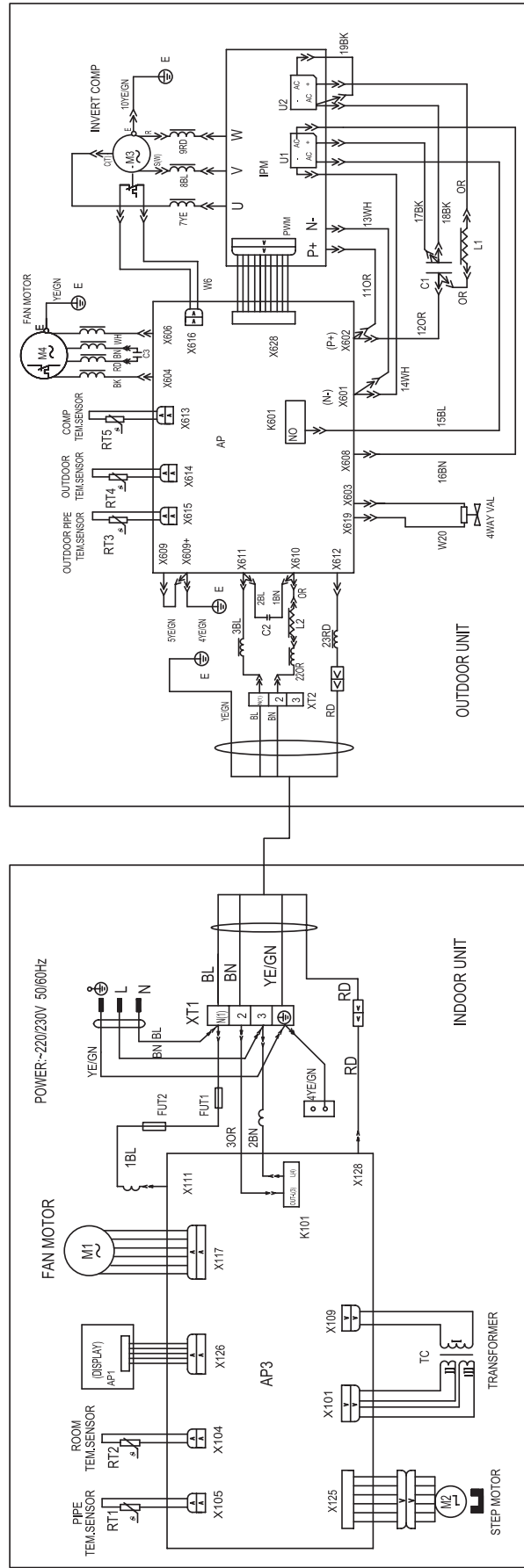
### 4.8 Circuit diagram

These circuit diagrams are subject to change.  
Please refer to the ones stuck on the machines.

KFR-25GW/A12F



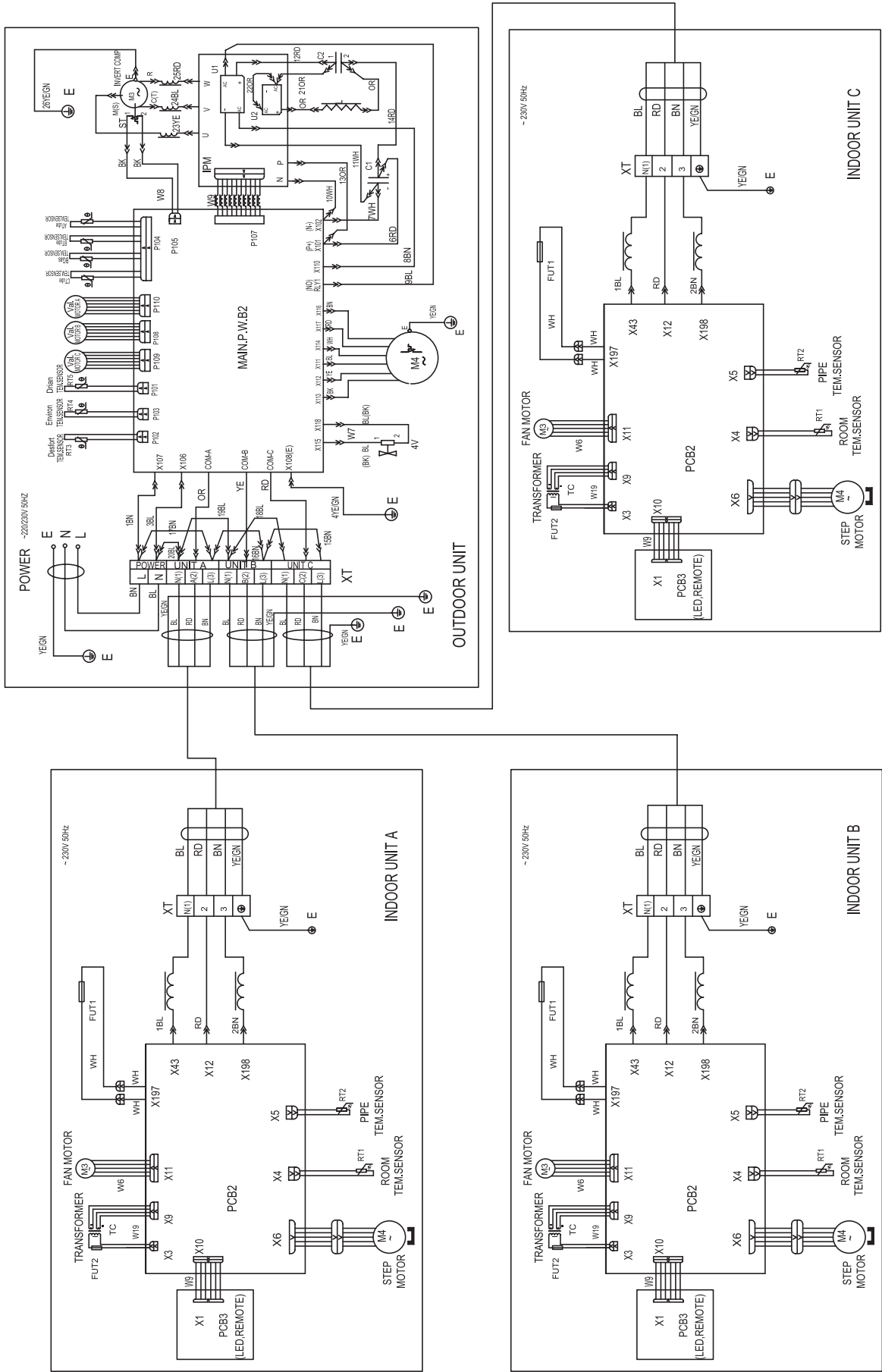
KFR-32GW/A12F



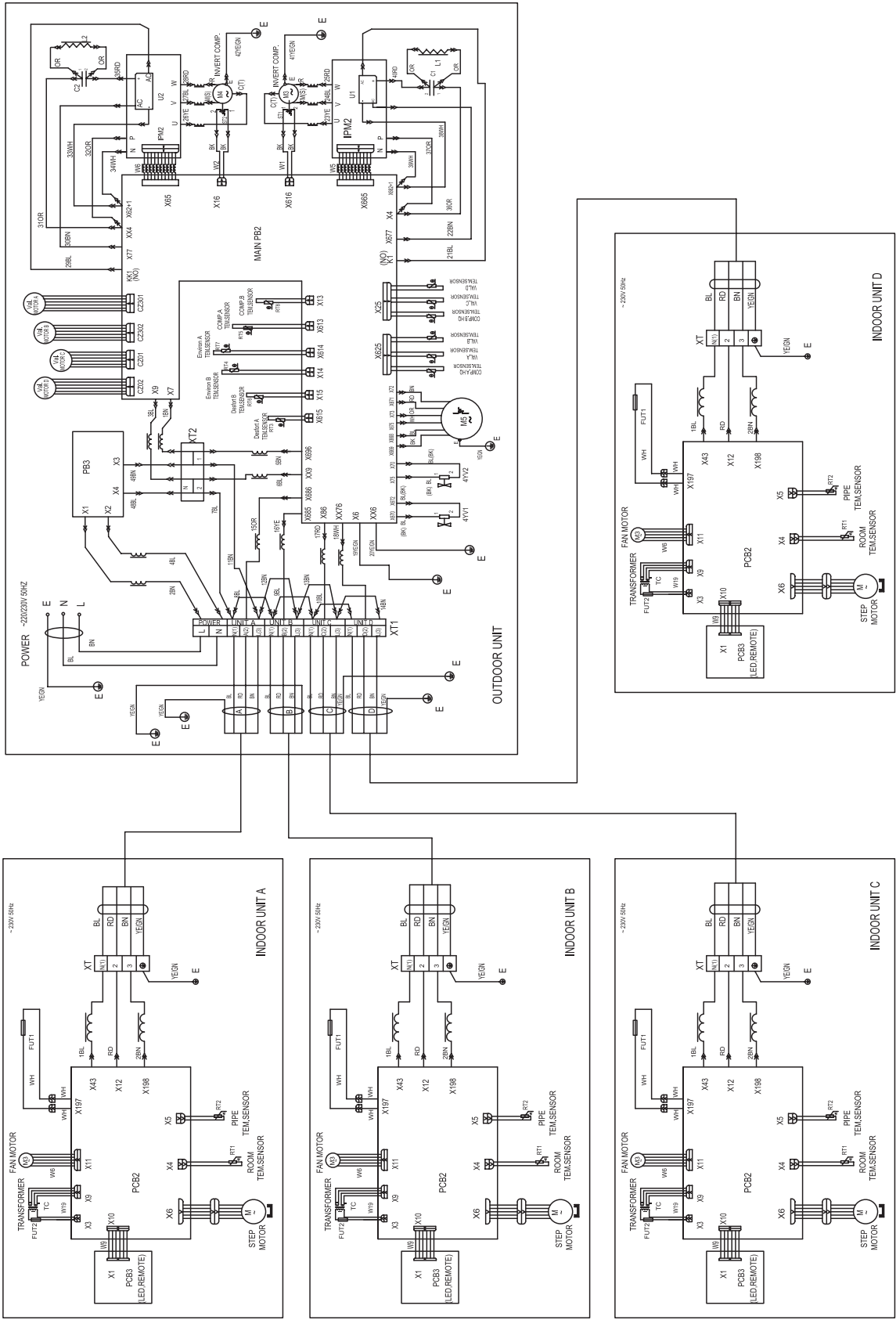




KFR-25X3GW/A12F



KFR-18X4GW/A12F



## 4.9 PCB function manual

### The PCB function manual of Bird Single-Split Inverter air conditioner (with memory function)

#### A. function description of PCB

- 1.Cooling
- 2.Heating
- 3.Fan
- 4.Dehumidifying
- 5.Auto
- 6.Manual operation

#### B. operation category of PCB

- 1.Indoor fan motor
- 2.Outdoor fan motor
- 3.Compressor
- 4.Guide louver
- 5.Beeper
- 6.Led (indoor and outdoor)
- 7.Electric heater
- 8.4-way valve
- 9.Outdoor supply
- 10.Pre-heat belt

#### C. parameter setting of PCB

- 1.Operation mode
- 2.Set temp.  $T_{set}$
- 3.Fan speed
- 4.Timer mode
- 5.Time
- 6.Guide louver situation
7. $T_{sur}$ : Surrounding temp. of indoor and outdoor environment
8. $T_{tb1}$ : Surface temp. of outdoor heat exchange copper tubes
9. $T_{tb2}$ : Surface temp. of indoor heat exchange copper tubes
- 10.Compressor temp.

11. Gross current  $I_t$
12. Sleep mode
13. Compressor overload protecting signal
14. Module capacity protecting signal

### D. fundamental functions

#### 1. cooling mode

##### (1) working conditions and procedure under cooling mode

a.  $T_{sur} \geq T_{set}$

The unit changes to cooling mode. Indoor fan motor, outdoor fan motor and compressor start to run, indoor fan motor operates at the set fan speed.

b.  $T_{sur} \leq T_{set} - 2^{\circ}\text{C}$

Compressor stops running, after 30 seconds delay, outdoor fan motor will stop running. Outdoor fan motor keeps on running at the set speed.

c.  $T_{set} - 2^{\circ}\text{C} < T_{sur} < T_{set}$

Unit remains current operation mode.

(2) Under this mode, temperature setting scope is  $16\sim 30^{\circ}\text{C}$  when reversing valve is out of supply.

##### (3) protecting functions

###### a. evaporator anti-freezing protection

Under cooling and dehumidifying modes, compressor keeps on running for 6 minutes:

◇  $T_{eva} \leq 2^{\circ}\text{C}$ : Capacity decent function starts to work.

◇ If  $T_{eva} \leq -1^{\circ}\text{C}$  lasts for 3 minutes, the compressor stops running and after 30 seconds delay, outdoor fan motor stops. Under cooling mode, indoor fan motor and stepping motor retain existing modes. Under dehumidifying mode, indoor fan motor runs at low speed and stepping motor retains existing mode.

◇  $T_{eva} \geq 6^{\circ}\text{C}$ : Unit restarts and gets into the previous operation mode.

b. The capacity descends when cross current rises.

◇ Cross current  $I_t \geq B$ , capacity upswing is forbidden.

◇ Cross current  $I_t \geq C$ , capacity descends falls down a certain degree at once. If the current keeps on rising, the capacity will descends for another time.

◇  $I_t \geq D$ , compressor stops running immediately and after 30 seconds delay, outdoor fan motor stops.

◇ For 3200W units:  $B=8\text{A}$ ,  $C=9\text{A}$ ,  $D=10\text{A}$

For 2500W units:  $B=6\text{A}$ ,  $C=7\text{A}$ ,  $D=8\text{A}$

#### 2. dehumidifying mode

##### (1) working conditions and procedure under dehumidifying mode

a.  $T_{sur} \geq T_{set}$

Dehumidifying function starts up. Indoor, outdoor fan motor and compressor begin to run. Indoor

## Bird Series

---

motor runs at low speed.

b.  $T_{\text{set}} - 2^{\circ}\text{C} \leq T_{\text{sur}} \leq T_{\text{set}}$

Unit retains dehumidifying mode.

c.  $T_{\text{sur}} < T_{\text{set}} - 2^{\circ}\text{C}$

Compressor stops operation, 30 seconds later outdoor fan motor stops. Indoor motor keeps on running at low speed.

(2) Temporary setting range: 16~30°C.

(3) protecting function

Please refer to cooling mode.

### 3. fan mode

(1) Indoor fan motor can operate at any speed rate (high, medium, low or automatically) under fan mode. Compressor and outdoor fan motor keep still.

(2) control conditions of automatic speed rate

a.  $T_{\text{sur}} > T_{\text{set}} + 4^{\circ}\text{C}$

The unit switches to high speed automatically.

b.  $T_{\text{set}} + 2^{\circ}\text{C} \leq T_{\text{sur}} \leq T_{\text{set}} + 4^{\circ}\text{C}$

The unit switches to medium speed automatically.

c.  $T_{\text{sur}} < T_{\text{set}} + 2^{\circ}\text{C}$

The unit switches to low speed automatically.

(3) Temperature setting range: 16~30°C.

### 4. heating mode

(1) working conditions and procedure under heating mode

a.  $T_{\text{sur}} \leq T_{\text{set}} + 2^{\circ}\text{C}$

Heating function starts up. Compressor, outdoor motor and 4-way valve operate at the same time. Indoor fan motor operates at the set speed rate under anti-cool air condition.

b.  $T_{\text{set}} + 2^{\circ}\text{C} < T_{\text{sur}} < T_{\text{set}} + 5^{\circ}\text{C}$

The unit retains heating mode.

c.  $T_{\text{sur}} \geq T_{\text{set}} + 5^{\circ}\text{C}$

Compressor stops running. Outdoor motor stops 30 seconds later. Indoor fan motor operates under blowing surplus heat condition with compressor indicator turning off.

d.  $0 > T_{\text{out}} > -3^{\circ}\text{C}$  ;  $-7^{\circ}\text{C} \leq T_{\text{out}} \leq -3^{\circ}\text{C}$  ;  $T_{\text{out}} < -7^{\circ}\text{C}$

The compressor's operation rates are F1 ; F2 ; F3.

(2) working conditions and procedure of condensing

Condensing function starts up when heating time lasts 45 minutes and any of the following conditions lasts 3 minutes:

a.  $T_{\text{out}} \geq 5^{\circ}\text{C}$  ,  $T_{\text{tb1}} \leq -4^{\circ}\text{C}$  ;

b.  $0^{\circ}\text{C} \leq T_{\text{out}} < 5^{\circ}\text{C}$  ,  $T_{\text{tb1}} \leq -8^{\circ}\text{C}$  ;

## Bird Series

---

c.  $-5^{\circ}\text{C} \leq T_{\text{out}} < 0^{\circ}\text{C}$ ,  $T_{\text{tb1}} \leq -12^{\circ}\text{C}$  ;

d.  $T_{\text{out}} < 5^{\circ}\text{C}$ ,  $T_{\text{tb1}} \leq -16^{\circ}\text{C}$

Under above situations, compressor and indoor fan motor stop at once, 30 seconds later, the outdoor motor and 4-way valve stop. The compressor will restart after another 15 seconds delay with the operation rate F1. The indoor operation indicator flashes when condensing.

After running for 5 minutes or when  $T_{\text{tb}} \geq 10^{\circ}\text{C}$ , compressor stops running. After 30 seconds delay 4-way valve turns on. Another 60 seconds later compressor and the outdoor motor switch back to operation status with the indicator flashing. Indoor fan motor operates under anti-cool air condition.

(3) Temperature setting range: 16~30°C.

(4) Under anti-cool air condition, compressor starts operation. 2 minutes later or when  $T_{\text{tb}} \geq 41^{\circ}\text{C}$ , indoor fan motor starts up at the set speed rate.

(5) blowing surplus heat function

After keeping running for 90 seconds, indoor fan motor stops.

(6) working conditions of auxiliary electric heater

Under heating mode, indoor motor runs at high and medium speed. If it detects indoor temperature  $T_{\text{sur}} \leq 22^{\circ}\text{C}$  or indoor heat exchanger temperature  $T_{\text{tb2}} \leq 48^{\circ}\text{C}$ , auxiliary electric heater starts to work.

Auxiliary electric heater will stop running if compressor stops running and indoor motor runs at low speed (or stops). The situation will be the same if  $T_{\text{sur}} \geq 25^{\circ}\text{C}$  or  $T_{\text{tb2}} \geq 54^{\circ}\text{C}$ .

When being switched off, auxiliary electric heat can be switched on only after 2 minutes delay.

(7) The capacity descends when cross current rises.

a. When cross current exceeds the stated current ( $I_t \geq X$ ), capacity upswing is forbidden. When  $I_t \geq Y$ , capacity falls down a certain degree. If the current goes on rising, capacity will fall down another certain degree until the real current is lower than stated cross current.

Under the circumstance, capacity will rise up a certain degree with a comparative lower temperature in the room. In case temperature in the room goes on declining, capacity will increase a certain degree until real current exceeds stated cross current.

b. When  $I_t \geq Z$ , compressor stops and outdoor motor stops.

c. For 3200W units: X=11A, Y=12A, Z=13A

For 2500W units: X=8A, Y=9A, Z=10A

### 5. auto mode

(1) working condition and procedure under auto mode

Standard cooling  $T_{\text{set}}=25^{\circ}\text{C}$ , standard heating  $T_{\text{set}}=20^{\circ}\text{C}$

①  $T_{\text{sur}} > T_{\text{set}}+1^{\circ}\text{C}$

Select cooling mode, from this time, the set temperature is 25°C.

$T_{\text{sur}} \leq T_{\text{set}}-2^{\circ}\text{C}$

Compressor and outdoor motor stop, indoor motor runs at the set speed.

$$T_{\text{set}} - 2^{\circ}\text{C} < T_{\text{sur}} < T_{\text{set}} + 1^{\circ}\text{C}$$

Keep the original state.

②  $T_{\text{sur}} \leq T_{\text{set}}$

Select heating mode, from this time, the set temperature is  $20^{\circ}\text{C}$ .

$$T_{\text{sur}} \geq T_{\text{set}} + 3^{\circ}\text{C}$$

Compressor stops first, outdoor motor stops 30 seconds later, indoor motor runs at low speed as the blowing condition.

$$T_{\text{set}} < T_{\text{sur}} < T_{\text{set}} + 3^{\circ}\text{C}$$

Keep the original state.

### (2) protection functions

a. The same as the one in cooling mode.

b. The same as the one in heating mode.

c. When surrounding temperature changes, it has no priority mode. Compressor hasn't 6-minute starting limitation.

## 6. protecting function and malfunction display (suitable for cooling , heating , dehumidifying and auto mode )

### (1) overload protection

$T_{\text{tb}}$ : Outdoor's heat exchanger temperature when cooling. or: Indoor's heat exchanger temperature when heating.

a.  $56^{\circ}\text{C} \leq T_{\text{tb}} < 58^{\circ}\text{C}$

Indoor motor runs at set speed rate, compressor runs at rate F5.

b.  $58^{\circ}\text{C} \leq T_{\text{tb}} < 62^{\circ}\text{C}$

Indoor motor runs at set speed rate, compressor runs at rate F2.

c.  $T_{\text{tb}} \geq 62^{\circ}\text{C}$

Indoor motor runs at set speed rate, compressor stops running.

d. When temperature descends ( $56^{\circ}\text{C} \leq T_{\text{tb}} < 60^{\circ}\text{C}$ )

Indoor motor runs at set speed rate, compressor runs at rate F2.

e.  $52^{\circ}\text{C} \leq T_{\text{tb}} < 56^{\circ}\text{C}$

Indoor motor runs at set speed rate, compressor runs at rate F5.

f.  $T_{\text{tb}} < 52^{\circ}\text{C}$

The unit returns to the previous operation mode.

### (2) compressor delay protection

Compressor can restart 3 minutes delay after the latest stopping.

### (3) compressor exhausting temperature protection

When compressor exhausting temperature  $\geq 103^{\circ}\text{C}$ , capacity increasing is forbidden. When the temperature  $\geq 108^{\circ}\text{C}$ , capacity begins to descend. If temperature goes on rising, capacity will fall down a certain degree. When temperature  $\geq 115^{\circ}\text{C}$ , compressor stops running. 3 minutes later, if it detects the temperature  $\leq 90^{\circ}\text{C}$ , compressor will restart.

## Bird Series

---

### (4) energy saving protection

When running under energy saving mode, compressor highest running rate is  $F_{max}=80\text{Hz}$  (cooling),  $F_{max}=90\text{Hz}$  (heating).

### (5) stated heating / cooling capacity testing

Select cooling or heating mode, press negative-ion & energy saving button.

### (6) indoor and outdoor malfunction indicators (Appendix Table-1)

(Attention: Outdoor malfunction indicators work only when compressor stops running.)

- ① Green lamp is on when compressor stops and malfunction occurs.
- ② Yellow lamp is on when outdoor temperature sensor has problem.
- ③ Red lamp is on when outdoor tube sensor has problem.
- ④ Green lamp flashes when module is protected.
- ⑤ Both red and yellow lamps flash when compressor is over loaded.
- ⑥ Green, red and yellow lamps are all on when exhausting temperature sensor has problem.
- ⑦ Indoor D1 is on when compressor runs.
- ⑧ Indoor D2, the communicate indicator, it flashes if units runs in order.
- ⑨ Indoor D3, the temperature sensor, it flashes when meeting problems.

**Appendix Table-1:**

| LED1        | LED2      | LED3         | D1 | D2    | D3    | Malfunction Description |
|-------------|-----------|--------------|----|-------|-------|-------------------------|
| Green On    |           |              |    |       |       | ①                       |
|             |           | Yellow On    |    |       |       | ②                       |
|             | Red On    |              |    |       |       | ③                       |
| Green Flash |           |              |    |       |       | ④                       |
|             | Red Flash | Yellow Flash |    |       |       | ⑤                       |
| Green On    | Red On    | Yellow On    |    |       |       | ⑥                       |
|             |           |              | On |       |       | ⑦                       |
|             |           |              |    | Flash |       | ⑧                       |
|             |           |              |    |       | Flash | ⑨                       |

Addition: LED1, LED2, LED3 are outdoor indicators. D1, D2, D3 are indoor main board indicators.

When defrosting, LED indicators flash.

## 7. other control categories



## Bird Series

---

### (1) mode selection

Press MODE button constantly to show the mode: AUTO-> COOL-> DRY-> FAN-> HEAT-> AUTO. Select the one you need.

### (2) temperature setting selection

Press TEMP $\wedge$  or TEMP $\vee$  for one more time, the set temperature will add or deduct 1°C. The working range is 16~30°C. This function is out of operation under AUTO mode.

### (3) emergency control

Control board switching provides auto, testing and stop functions.

#### a. auto function

Use auto function when remote controller is lost. Auto model is selected if pressing the button once, indoor motor runs at auto speed and guide louvers work under swing mode. If detecting remote control signals, unit runs according to signals.

#### b. testing function

Middle cooling model is selected when pressing button for twice consecutively. If pressing button for three times consecutively, middle heating model is selected. (Middle cooling / heating is for air conditioner testing purpose.) If remote control directives are detected, unit will run with remote control mode.

#### c. stop function

If pressing the button for 4 times consecutively, the unit stops running.

### (4) time setting selection

Press the button one more time, the set hour will be up or down 0.5 hour. Working range is 0~24 hours.

### (5) sleep mode control

a. Under cooling or dehumidifying mode, 1 hour after you set the sleep timer,  $T_{set}$  will add 1°C, 2 hours later  $T_{set}$  adds another 1°C. Unit goes on to run under this status.

b. Under heating mode, if timer is set,  $T_{set}$  will lower 1°C one hour after SLEEP model is selected.  $T_{set}$  will lower another 1°C two hours later. Unit goes on to run under this status.

c. Under fan mode and Auto mode, the set temperature doesn't change.

### (6) indoor fan motor control

Indoor fan motor can be set to run at HIGH, MED, LOW speed by pressing the button. Fan speed can be set as AUTO speed. Compressor running rate determines fan speed. Indoor fan motor runs at low speed under swing mode.

### (7) swing selection

Use the remoter swing button to switch on / off. Louvers works when indoor fan motor operates.

### (8) beeper control

When air conditioner switches on or it receives operative signals from remote controller or buttons are pressed, buzzer will buzz.

### (9) ON / OFF button

Press the button constantly to switch on / off.

## Bird Series

---

(10) auto speed levels

$F \leq 60\text{Hz}$ : Low speed

$60\text{Hz} < F < 80\text{Hz}$ : Medium speed

$F \geq 80\text{Hz}$ : High speed

Switches among above speed levels are affected by different loading. Unit runs at the most suitable speed under blurring control. Under swing mode, auto speed selects low speed automatically.

## The PCB function manual of Bird Dual-Split Inverter air conditioner (with memory function)

### 1. Running mode

- 1) Cool    2) Dehumidify    3) Fan    4) Heat    5) Auto

### 2. The parameter to be input

Remote controller:

- 1) The set mode
- 2) The set temperature  $T_{\text{set}}$
- 3) The set fan speed
- 4) Timer mode
- 5) The set time

Indoor:

- 1) The ambient temperature of the indoor unit  $T_{\text{in}}$
- 2) The evaporator tube temperature  $T_{\text{eva}}$
- 3) Four-level switch

Outdoor:

- 1) The condenser tube temperature  $T_{\text{con}}$
- 2) The discharge temperature of compressor  $T_{\text{dis}}$
- 3) The return-air temperature of compressor  $T_{\text{ret}}$
- 4) The ambient temperature of the outdoor unit  $T_{\text{out}}$
- 5) The rear temperature of electric expansion valve  $T_{\text{val1}}$
- 6) The rear temperature of electric expansion valve  $T_{\text{val2}}$
- 7) Total current  $I_t$

### 3. Target of PCB

- 1) Indoor fan motor (Fan motor)
- 2) Stepping motor (Swing motor)
- 3) Buzzer
- 4) Running indicator
- 5) Electrical heater (unavailable for this model temporarily)

- 6) Outdoor fan motor (Dual speeds AC motor)
- 7) Compressor
- 8) 4-way reversing valve
- 9) Electric expansion valve

### 4. Fundamental functions of PCB

#### 1) LED board

There is a LED BOARD in each indoor unit which is connected with Indoor PCB by connecting cable between boards.

Remote-receiving head is for receiving signal from remote controller

Red lamp is for Running, keeps lighting during running and keeps flickering during failure or defrosting of heat pump function.

Green lamp is for dehumidifying of cooling only function and keeps lighting when the status is running or dehumidifying.

Yellow lamp is for heat pump and keeps lighting during heat pump.

#### 2) Four-level switch

Pull switch in order is for: Turnoff, Running, Testing and Auto.

Turnoff level: PCB doesn't receive any signal and the unit is in the state of shutdown.

Running level: PCB can receive and carry out the remote signal.

Testing level: Turn to testing level and enter the state of forced cooling running.

When remote signal is heating & energy-saving: Rated heating running;

When remote signal is cooling & energy-saving: Rated cooling running;

Auto level: Indoor PCB checks indoor temperature, the unit runs in the state of Auto and the Fan speed is Auto.

#### 3) Working mode

##### a. AUTO mode

Cooling  $T_{set} = 25^{\circ}\text{C}$ , Heating  $T_{set} = 20^{\circ}\text{C}$

If  $T_{in} > T_{set} + 1^{\circ}\text{C}$  of any indoor unit, select cooling mode, from this time the connotative set temperature is  $25^{\circ}\text{C}$ ; If  $T_{in} \leq T_{set} - 2^{\circ}\text{C}$  for both of indoor units, compressor and outdoor motor stop, and indoor fan motor runs at the set speed; If  $T_{set} - 2^{\circ}\text{C} < T_{in} \leq T_{set} + 1^{\circ}\text{C}$ , keeps the original state.

If  $T_{in} \leq T_{set}$  of any indoor unit, select heating mode, from this time the connotative set temperature is  $20^{\circ}\text{C}$ ; If  $T_{in} \geq T_{set} + 3^{\circ}\text{C}$  for both of indoor units, compressor stops, outdoor motor stops 30 seconds later, and indoor fan motor runs as the blowing surplus heat condition; If  $T_{set} < T_{in} < T_{set} + 3^{\circ}\text{C}$ , keeps the original state.

In Auto state, the indoor unit may stop due to the conflict caused by mode.

In cooling state, the protection function is the same as in cooling mode;

In heating state, the protection function is the same as in heating mode.

b. Cooling mode (The range of  $T_{set}$ :  $16^{\circ}\text{C}$ - $30^{\circ}\text{C}$ , primary set temperature is  $24^{\circ}\text{C}$ )

The outdoor fan motor is at high speed. In Cooling mode, the frequency of compressor and the open angle of electric expansion valve are controlled fuzzily after all the input parameters are analyzed. The compressor's frequency converts up or down at 1Hz/second. At rated cooling state the frequency is 40Hz when single unit is turned on, and 65Hz when dual indoor units are turned on.

Max. frequency: 54Hz when single indoor unit on;  
90Hz when dual indoor units on.

If  $T_{in} < T_{set}$  for both indoor units and cooling mode starts when both indoor units are in stand-by state, indoor fan motor runs at the set speed, outdoor unit doesn't work;

If  $T_{in} \geq T_{set}$  for single indoor unit and cooling mode starts when both indoor units are in stand-by state, the indoor fan motor, outdoor fan motor and compressor start running, and indoor fan motor runs at the set speed;

If  $T_{in} < T_{set} - 2^{\circ}\text{C}$ , in running state, the compressor stops, outdoor fan motor stops 30 seconds later and indoor fan motor still run at the set speed.

c. Dehumidifying mode (The range of  $T_{set}$ :  $16^{\circ}\text{C}$ - $30^{\circ}\text{C}$ , primary set temperature is  $24^{\circ}\text{C}$ )

The outdoor fan motor is at high speed. In Dehumidifying mode, the frequency of compressor and the open angle of electric expansion valve are controlled fuzzily after all the input parameters are analyzed. The compressor's frequency converts up or down at 1Hz/second. When the requirement of dehumidifying is met, Max. frequency is:

37Hz when single indoor unit on;  
55Hz when dual indoor units on.

When Dehumidifying mode starts from the stand-by state of both indoor units, if  $T_{in} \leq T_{set}$  for both indoor units, indoor fan motor runs at the low speed, outdoor unit doesn't work; If  $T_{in} > T_{set}$  for single indoor unit, the indoor fan motor, outdoor fan motor and compressor start running and indoor fan motor run at low speed; If  $T_{in} < T_{set} - 2^{\circ}\text{C}$  for both indoor units, in running state, the compressor stops, outdoor fan motor stops 30 seconds later and indoor fan motor still run at low speed.

d. Fan Mode

In this mode, indoor fan motor can run at high, mid, low or auto mode, compressor and outdoor fan motor both stop, indoor fan motor runs at set speed.

Control condition of auto fan mode:

In cooling and fan mode:

|  |                               |
|--|-------------------------------|
| $T_{in} > T_{set} + 4^{\circ}\text{C}$                                     | high fan speed automatically; |
| $T_{set} + 2^{\circ}\text{C} \leq T_{in} \leq T_{set} + 4^{\circ}\text{C}$ | mid fan speed automatically;  |
| $T_{in} < T_{set} + 2^{\circ}\text{C}$                                     | low fan speed automatically;  |

In heating mode:

|  |                               |
|--|-------------------------------|
| $T_{in} < T_{set} - 4^{\circ}\text{C}$                                     | high fan speed automatically; |
| $T_{set} - 2^{\circ}\text{C} \geq T_{in} \geq T_{set} - 4^{\circ}\text{C}$ | mid fan speed automatically;  |
| $T_{in} > T_{set} - 2^{\circ}\text{C}$                                     | low fan speed automatically;  |

e. Heating mode (The range of  $T_{set}$ :  $16^{\circ}\text{C}$ - $30^{\circ}\text{C}$ , primary set temperature is  $24^{\circ}\text{C}$ )

The speed of outdoor fan motor is subject to the quantity of indoor units so as to meet the requirement in heating mode: low speed for single unit; high speed for dual units. In Heating mode, the frequency of compressor and the open angle of electric expansion valve are controlled fuzzily after all the input parameters are analyzed. The compressor's frequency converts up or down at 1Hz/second. When the requirement of heating mode is met, Max. frequency is:

58Hz when single indoor unit on;

90Hz when dual indoor units on

When Heating mode acts from the stand-by state of both indoor units, if  $T_{in} > T_{set} + 1^{\circ}\text{C}$  for both indoor units, indoor fan motor doesn't run, outdoor unit doesn't work; If  $T_{in} \leq T_{set} + 1^{\circ}\text{C}$  for single indoor unit, the outdoor fan motor, 4-way reserving valve and compressor start running and indoor fan motor run at the set anti-cool-air speed; If  $T_{in} \geq T_{set} + 2^{\circ}\text{C}$  for both indoor units, in running state, the compressor stops, outdoor fan motor stops 30 seconds later and indoor fan motor still run blowing surplus heat.

Defrosting condition and process:

The PCB receives the  $T_{out}$ ,  $T_{con}$  and lasting time of heating, then controls the defrosting cycle through estimating the frosting condition by fuzzy calculation, so as that the best heating effect can be achieved. The defrosting process is as follows: When the unit is in heating mode for 47 minutes, and it detects the lasting time of any of the following four conditions is over two minutes, it begins to defrost:

$T_{out} \geq 5^{\circ}\text{C}$  and  $T_{con} \leq -4^{\circ}\text{C}$ ;

$-2^{\circ}\text{C} \leq T_{out} < 5^{\circ}\text{C}$  and  $T_{con} < -5^{\circ}\text{C}$ ;

$-5^{\circ}\text{C} \leq T_{out} < -2^{\circ}\text{C}$  and  $T_{con} < -10^{\circ}\text{C}$ ;

$T_{out} < -5^{\circ}\text{C}$  and  $T_{con} < -18^{\circ}\text{C}$

When defrosting starts, the running LED of indoor unit keeps flashing, the compressor stops, the indoor fan motor stops, outdoor fan motor delays to stop and 4-way valve delays to stop. Ten seconds later the compressor starts and defrosting starts. When the compressor starts running for ten minutes or  $T_{con} \geq 9.8^{\circ}\text{C}$ , after defrosting is finished, the compressor will stop; 30 seconds later 4-way valve is on. Another 30 seconds, compressor and outdoor fan motor keep running, running LED of indoor unit stop flashing and the indoor fan motor duns at the set anti-cool air mode.

Anti-cool air condition: After the compressor starts running, the  $T_{eva}$  is detected. If  $T_{eva} \geq 41^{\circ}\text{C}$  or the compressor starts running for three minutes, the indoor fan motor runs at the set speed.

Blowing surplus heat: Blowing surplus heat starts after compressor starts running for at least one minute. During this process the indoor fan motor runs at the smallest speed for 90 seconds then stops.

Auxiliary heater working condition: ( Unavailable temporarily for this model)

When indoor fan motor is running at high or middle speed, and  $T_{in} \leq 22^{\circ}\text{C}$  or  $T_{eva} \leq 46^{\circ}\text{C}$ , auxiliary heater is switched on; If compressor stops, indoor fan motor runs at low speed or not running or  $T_{in} \geq 25^{\circ}\text{C}$  or  $T_{eva} \geq 50^{\circ}\text{C}$ , auxiliary heater stops. After the auxiliary heater is switched off, it can not be switched on for at least two minutes.

### 4) Protection

#### a. General protection function for all the modes

Delay protection for Compressor:

Compressor's starting interval should be more than three minutes;

Discharge temperature protection of compressor:

When the discharge temperature of compressor  $T_{dis} \geq 115^{\circ}\text{C}$ , the compressor stops for three minutes. Later if  $T_{dis} \leq 95^{\circ}\text{C}$ , the compressor starts. When  $T_{dis} \geq 95^{\circ}\text{C}$ , the frequency is not allowed to rise. When  $T_{dis} \geq 106^{\circ}\text{C}$ , the frequency will be decreased. If the temperature keeps rising, the frequency will be switched to the lower frequency segment.

Module protection:

In inverter module, there are overload protection, anti high temperature protection, short circuit protection and low power supply protection. In case of the above protection, the unit will be switched off automatically.

#### b. Protection function in Cooling or Dehumidifying modes

Anti-freezing function:

(1) Set single indoor unit run: If the compressor starts running for ten minutes and five seconds and it detects  $T_{eva} \leq -2.3^{\circ}\text{C}$ , the compressors will stop running immediately (no frequency drop process). 28 seconds later the outdoor fan motor stops running, and indoor fan motor and swing motor keep the original state. Three minutes later if the  $T_{eva} \geq 10.2^{\circ}\text{C}$ , the indoor unit starts running and there is no any indication during protection.

If the protection doesn't reach the temperature requirement of quitting protection, the unit will be shut down and restarts running, the compressor starts running again after three minutes delay.

(2) Set dual indoor units run: Firstly, A indoor unit reaches the temperature of anti-freezing protection: The indoor fan motor, outdoor fan motor and stepping motor keep original state, the compressor runs while the frequency dropping. The electric expansion valve of A unit is switched off completely; The B indoor unit keeps running normally.

Then B indoor unit reaches the temperature of anti-freezing protection: The compressor stops running immediately (no frequency drop process). 28 seconds later the outdoor fan motor stops running, and indoor fan motor and stepping motor keep the original state. Three minutes later if the  $T_{eva} \geq 10.2^{\circ}\text{C}$ , the outdoor unit starts running.

Current overload protection:

In Cooling or Dehumidifying mode, when the total current  $I_t$  surpasses 20A, forbidding the frequency to rise; When the  $I_t$  surpasses 22A, the compressor and outdoor fan motor stop, start running three minutes later.

#### c. Protection function in Heating mode

Current overload protection:

In Heating mode, when the total current  $I_t$  surpasses 20A, forbidding the frequency to rise; When the  $I_t$  surpasses 22A, the compressor and outdoor fan motor stop, start running three minutes later.

Anti high temperature protection:

## Bird Series

---

The PCB adjusts the frequency value of compressor and the open angle of electric expansion valve according to the value of  $T_{eva}$ . If it detects  $T_{eva} \geq 65^{\circ}\text{C}$ , the compressor stops running, outdoor fan motor stops by delay, the indoor fan motor stops as per the condition of blowing surplus heat. Three minutes later, if it detects  $T_{eva} \leq 55.2^{\circ}\text{C}$ , heating mode starts again.

Pre-heat belt protection:

When the ambient temperature of the outdoor unit  $T_{out}$  is over low and affects the normal work of the compressor, the pre-heat belt starts working for 15 minutes firstly, then the unit starts running normally.

### 5) Energy-saving function

During running, the running power is around 70% of full power.

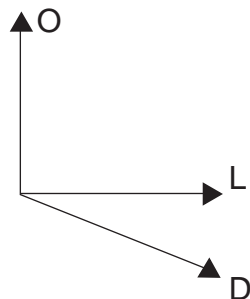
### 6) Memory function

After the power is cut suddenly, if the power is connected, the unit will restart in the old mode by memory function.

### 7) Other controls

Swing motor (Stepping motor)

Swing, refer to the figure below:



### 8) Sleep mode

a. In Cooling or Dehumidifying mode, one hour after you set the sleep timer,  $T_{set}$  adds  $1^{\circ}\text{C}$  automatically; Another one hour, another  $1^{\circ}\text{C}$  is added. The fan speed works at low level.

b. In Heating mode, one hour after you set the sleep timer,  $T_{set}$  lowers  $1^{\circ}\text{C}$  automatically; Another one hour, another  $1^{\circ}\text{C}$  is lowered. The fan speed works at low level.

After the temperature rises or falls for  $2^{\circ}\text{C}$ , the unit will keep running at this temperature and the temperature will not be increased or decreased, the indoor fan motor runs at the set speed.

### 9) Timer function

Timer for turning on:

The unit is stopped when the timer for turning on acts. When it is time to turn on, the PCB will act in the set mode. The distance of setting twice is 0.5 hour and time range is 0.5-24 hours.

Timer for turning off:



## Bird Series

---

Set the timer for turning off function when the unit is at the state of stop. When it is time to turn off, the unit will be switched off. The distance of setting twice is 0.5 hour and time range is 0.5-24 hours.

### 10) Control of the electric expansion valve

The open angle of electric expansion valve can be controlled freely between 0 to 500 steps.

In the initial time when it is powered on, the electric expansion valve will recover to the state of turning off. Then it will switch on or off according to the requirement of indoor units.

The PCB for dual split can control two electric expansion valves separately, and adjusts the open angle according to the required cooling or heating capacity by the two indoor units and the actually supplied cooling or heating capacity.

### 11) Conflict between two indoor units

Conflict happens between Cooling, Dehumidifying and Fan modes; There are conflict between Heating mode and other modes. During the conflict, the buzzer if the later turned on indoor unit buzzes for one time, then this indoor unit is turned off. All the indicator light on the LED board are switched off.

### 12) Failure Indication

Indication method of indoor unit failure:

There are three indicator lights for indoor unit failure, one is running indicator light (red) on the LED board; another two are D1 (green) and D2 (yellow) on the PCB board of indoor unit. Green light is for communication. When the communication is normal, the yellow light keeps flashing every five seconds; Yellow light is for the indicator for sensor failure. If the sensor is in good condition, this light doesn't light; The running indicator light on the LED board keeps lighting when the unit runs normally. It keeps flashing when defrosting starts or failure happens on outdoor unit. It remains lighting after defrosting is finished or the failure is removed.

Indication method of outdoor unit failure:

There are three indicator lights for outdoor unit failure. When the compressor stops, the corresponding failure of indicator lights are as follows:

| No. | Yellow light | Red light | Green light | Content                                     |
|-----|--------------|-----------|-------------|---|
| 1   |              |           | Light       | Faiure of ambient temperature sensor        |
| 2   |              | Light     |             | Failure of heat-exchange temperature sensor |
| 3   |              | Flashing  | Flashing    | Over high temperature of compressor         |
| 4   | Light        |           |             | Failure of A valve temperature sensor       |
| 5   | Light        |           | Light       | Failure of B valve temperature sensor       |
| 6   | Flashing     |           |             | Module protection                           |
| 7   | Light        | Light     | Light       | Failure of discharge temperature sensor     |

## The PCB function manual of Bird Triple-Split Inverter air conditioner (with memory function)

### 1. Summary

This PCB is for KFR-25 X 3GW/A12F Bird Triple-Split Inverter air conditioner. Except for the performance of normal PCB, it adopts three electric expansion valves. This PCB can control three indoor units separately through adjusting three electric expansion valves, so as that the three indoor units can run independently like three independent air conditioners. When the area difference of three rooms is big or the temperature requirement of the host of three rooms is in big difference, it can meet the different requirement of three rooms.

### 2. Fundamental performance index

- 1) Voltage range: 160-260V AC, 50Hz
- 2) Storage temperature: - 40°C~85°C

### 3. Fundamental function of PCB

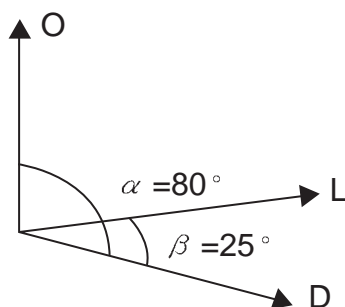
- 1) Indoor unit
  - (1) Five running modes: Auto, Cool, Dehumidify, Fan, Heat
  - (2) Time delay safety control

After it stops, the compressor starts running again after three minutes delay.

- (3) Indoor fan motor control

High, mid and low three levels: High speed 1200rpm; middle speed 1050 rpm; low speed 900rpm.

- (4) Swing angle control



When it is powered on or the unit stops, the louver is at the position O; When the swing motor shuts down, the angle of shutting down is over  $\alpha=100^\circ$ ; When the unit is turned on, the louver swings to stop at the position D. In swing state, the louver swings between position L and position D.

### (5) Function of switch

There are four levels: Turn off; Running; Testing; Auto

Function:

- ① Turn off level: the unit stops running and doesn't accept signal.
- ② Running level: receiving remote control command and running according to the command.
- ③ Testing level: When it is switched to test level, it enters into forced cooling, indoor fan motor runs at high speed. If there is remote control command, it runs as per the received command. When the Energy-saving button is pressed, it enters into the rated condition.
- ④ Auto level: In Auto mode, if there is remote control command, the unit runs as per the command.

### (6) When the indoor unit is set Auto Fan, the difference between indoor ambient temperature and set temperature:

|  |        |
|--|--------|
| $\Delta T \geq 4^{\circ}\text{C}$                        | High   |
| $2^{\circ}\text{C} \leq \Delta T \leq 3^{\circ}\text{C}$ | Middle |
| $\Delta T \leq 1^{\circ}\text{C}$                        | Low    |

### (7) Sleep function

- a. In Cooling or dehumidifying mode, one hour after you set the sleep timer, the set temperature adds  $1^{\circ}\text{C}$  automatically; Another one hour, another  $1^{\circ}\text{C}$  is added. Two hour later, the temperature doesn't rise again and the unit runs in this temperature.
- b. In heating mode, one hour after you set the sleep timer, the set temperature is lowered by  $1^{\circ}\text{C}$ ; Another one hour, another  $1^{\circ}\text{C}$  is lowered. After two hours, the temperature doesn't fall any more. The unit runs in this temperature.

### (8) Memory function

After the power is cut suddenly, if the power is connected, the unit will restart in the old mode by memory function.

## 2) Outdoor unit

### (1) Speed control of outdoor fan motor (three levels)

- ① Single indoor unit (cooling/heating): Middle fan speed; If in heating mode the outdoor ambient temperature  $T_{\text{out}} \geq 21^{\circ}\text{C}$  or in cooling mode  $T_{\text{out}} < 28^{\circ}\text{C}$ , the outdoor fan motor is at low speed.
- ② Two or three indoor units (cooling/heating): High speed level.

### (2) Failure indication of outdoor unit

There are three indicator lights for outdoor unit failure. When the compressor stops, the corresponding color of failure indication code LED1, LED2 and LED3 are red, yellow and green.

## Bird Series

| No. | LED3     | LED2     | LED3     | Content  |
|-----|----------|----------|----------|--|
| 1   |          |          | Light    | Ambient temperature  |
| 2   |          | Light    |          | Heat-exchanger (Tube temperature)  |
| 3   |          | Light    | Light    | Failure of ischarge temperature sensor                                     |
| 4   | Light    | Light    |          | Failure of return air temperature sensor                                   |
| 5   |          |          | Flashing | Communication  |
| 6   |          | Flashing |          | Anti-freezing  |
| 7   |          | Flashing | Flashing | Anti high temperature  |
| 8   | Flashing |          |          | Over high temperature of compressor ( $T_{dis} \geq 110^{\circ}\text{C}$ ) |
| 9   | Flashing |          | Flashing | Overcurrent  |
| 10  | Flashing | Flashing |          | Overload   |
| 11  | Flashing | Flashing | Flashing | Module overcurrent or overload   |

(3) 4-way valve control

(4) Electric expansion valve control

The specification of electric expansion valve is: Pacific, calibre  $\Phi$  1.8, open angle 0~500° .

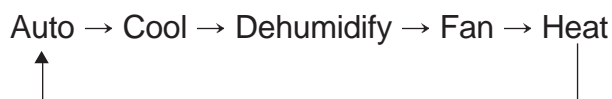
(5) Sensor

Total seven sensors. One is discharge temperature sensor ( $T_{dis}$ ), another six are for return air, ambient temperature, heat-exchanger, after throttling for A unit, after throttling for B unit, after throttling for C unit.

(6) The new power module is adopted.

3) Working mode

The running modes of this unit include: Auto, Cool, Dehumidify, Fan, Heat. As per the function button of remote controller, the sequence of cycle is as follows:



In the following working modes, the indoor ambient temperature is called as  $T_{in}$ , the set temperature called as  $T_{set}$ , the indoor tube temperature called as  $T_{eva}$ , the outdoor tube temperature called as  $T_{con}$ , and the discharge temperature called as  $T_{dis}$ .

(1) Condition for Auto running mode

① When the remote controller is set as Auto, it enters into Auto mode:

If  $T_{in} > 26^{\circ}\text{C}$ , cooling mode acts, the  $T_{set}$  is  $26^{\circ}\text{C}$ .

If  $T_{in} < 20^{\circ}\text{C}$ , heating mode acts, the  $T_{set}$  is  $20^{\circ}\text{C}$ .

If  $20^{\circ}\text{C} \leq T_{in} \leq 26^{\circ}\text{C}$ , running in the Fan mode.

② Protection function: If it enters into cooling mode from Auto mode, the protection is the same as in cooling mode.

If it enters into heating mode from Auto mode, the protection is the same as in heating mode

### (2) Cooling running mode

#### ① Condition and process in cooling running mode

- a. The difference between two indoor ambient temperature and the set temperature: if  $T_{in} - T_{set} > 1^{\circ}\text{C}$ , the compressor and outdoor fan motor runs.
- b. If  $T_{in} - T_{set} \leq 1^{\circ}\text{C}$ , the compressor and outdoor fan motor stop running, while the indoor unit keeps the old running mode.
- c. If  $T_{set} - 1^{\circ}\text{C} < T_{in} < T_{set} + 1^{\circ}\text{C}$ , it runs in fuzzy state.
- d. If the indoor unit is set as Low Fan Speed, the indoor unit sends signal to outdoor unit and the frequency is decreased. The measures such as changing open angle of valve are taken to avoid dewing.

#### ② Running range in cooling mode

The temperature setting range is  $16^{\circ}\text{C} \sim 30^{\circ}\text{C}$ .

#### ③ Protection

##### a. Anti-freezing protection

If  $T_{eva} \leq -1^{\circ}\text{C}$  and lasts for four minutes and fifteen seconds, the compressor stops. The indoor unit runs.

##### b. Compressor discharge temperature protection

If  $T_{dis} \geq 104^{\circ}\text{C}$ , frequency is decreased;

If  $T_{dis} < 104^{\circ}\text{C}$ , it runs normally;

If  $T_{dis} \geq 110^{\circ}\text{C}$ , the compressor stops running. If  $T_{dis} \leq 90^{\circ}\text{C}$ , the compressor re-starts after three-minutes detection. When the overload protection switch acts, the compressor stops running.

##### c. Current protection

If the total current of three indoor units surpasses 21A or current of single indoor unit surpasses 18A, the compressor stops running.

### (3) Dehumidifying mode

#### ① Condition and process in dehumidifying mode

If  $T_{in} - T_{set} > 2^{\circ}\text{C}$ , the same as in cooling mode;

If  $T_{in} - T_{set} \leq 2^{\circ}\text{C}$ , dehumidifying mode acts, the compressor runs at changeable frequency or low frequency in turns;

If  $T_{set} - T_{in} \geq 2^{\circ}\text{C}$ , the compressor stops, outdoor fan motor and indoor fan motor run at set speed.

#### ② Dehumidifying running range

The set temperature range is  $16 \sim 30^{\circ}\text{C}$ .

#### ③ Protection

In dehumidifying mode, the protection function is the same as in cooling mode.

### (4) Fan mode

In fan mode, the outdoor unit doesn't work, only the indoor fan motor and swing motor (stepping motor) can be controlled. If the fan speed is at Auto, it runs at Auto speed of indoor unit. If the speed

is set through the remote controller, the indoor fan motor runs at the set speed.

### (5) Heating mode

#### ① The working condition in heating mode

Compensated temperature  $T_{com} = 1^{\circ}\text{C}$

The difference between the current ambient temperature for two indoor units and the set temperature: If  $T_{set} - T_{in} \geq 1^{\circ}\text{C}$ , the compressor and 4-valve act, the outdoor fan motor runs.

If  $T_{in} - T_{set} \leq 1^{\circ}\text{C}$ , it keeps the previous running state.

If  $T_{in} - T_{set} \leq 2^{\circ}\text{C} + T_{com}$ , the compressor and outdoor fan motor stop running 30 seconds later, the indoor fan motor keeps blowing surplus heat for 90 seconds then stops.

#### ② Running range

The set temperature range is  $16 \sim 30^{\circ}\text{C}$ .

#### ③ Protection

##### a. Anti-cool air function

During the rise of indoor tube temperature, the running of indoor unit is controlled by the indoor tube temperature. If  $T_{eva} > 41^{\circ}\text{C}$  or the compressor starts running for two minutes, the indoor fan motor runs at the set speed.

##### b. Blowing surplus heat

After the unit is turned off from heating mode, the indoor fan motor runs at the low speed for 90 seconds then stops.

##### c. Over high temperature protection of compressor

The same as cooling mode.

##### d. Defrosting process

The working conditions of defrosting: Defrosting acts if the unit runs in heating mode over 40 minutes and the lasting time of any of the following conditions is over five minutes.

①  $T_{out} \geq 5^{\circ}\text{C}$ ,  $T_{con} < -5^{\circ}\text{C}$ ;

②  $0^{\circ}\text{C} \leq T_{out} < 5^{\circ}\text{C}$ ,  $T_{con} < -5^{\circ}\text{C}$ ;

③  $-5^{\circ}\text{C} \leq T_{out} < 0^{\circ}\text{C}$  and  $T_{con} < -10^{\circ}\text{C}$ ;

④  $T_{out} < -5^{\circ}\text{C}$  and  $T_{con} < -16^{\circ}\text{C}$

After defrosting acts, the compressor, outdoor fan motor and indoor fan motor stops; 30 seconds later the 4-way valve switches. Another 20 seconds later the compressor acts. After eight minutes or if  $T_{con} > 12^{\circ}\text{C}$ , defrosting stops, the compressor stops running. 1.5 minutes later the unit enters into heating running mode.

##### e. Indoor anti-high temperature protection

If  $T_{con} < 55^{\circ}\text{C}$ , it runs in normal state;

If  $55^{\circ}\text{C} \leq T_{con} \leq 65^{\circ}\text{C}$ , the frequency is decreased;

If  $T_{con} > 65^{\circ}\text{C}$ , the unit stops.

##### f. Current overload protection

When the total current of three indoor units surpasses 22A, or two indoor units surpasses 21A, or single unit surpasses 18A, the compressor stops running.

## Bird Series

---

### 4) Conflict between three indoor units

The standard mode is subject to the firstly turned-on indoor unit: There is no conflict between cooling and dehumidifying modes, or between cooling and fan modes, but it happens between cooling and heating modes; It conflicts between heating and cooling or heating and dehumidifying modes. During the conflict, the indoor unit is switched off after the buzzer acts once.

### 5) Others

Indoor unit LED1 (green indicator light): Communication indication. The state is changed after receiving the signal from outdoor unit.

Indoor unit LED2 (yellow indicator light): Indoor temperature sensor failure indication. It is switched off in the normal state and keeping flashing during failure.

Outdoor S2 short connector has the function of quick detecting.

**The PCB function manual of  
Bird Quadruple-Split Inverter air conditioner  
(with memory function)**

**A. OPERATION MODE**

1. Cool; 2. Dehumidifying 3. Blowing 4. Heating 5. Auto

**B. INPUT PARAMETERS**

Remote controller:

1. The set operation mode
2. The set temperature  $T_{set}$
3. The set fan speed
4. The timing methods
5. Timer

Indoor:

1. Indoor temperature  $T_{in}$
2. Evaporator tube temperature  $T_{eva}$
3. Switch board

Outdoor:

1. Condenser tube temperature  $T_{con}$
2. Compressor exhaust-out temperature  $T_{dis}$
3. Compressor exhaust-in temperature  $T_{ret}$
4. Outdoor temperature  $T_{out}$
5. Electric expanding valve temperature  $T_{val1}$
6. Electric expanding valve temperature  $T_{val2}$
7. Gross current  $I_t$

**C. PCB TARGETS**

1. Indoor fan motor
2. Stepping motor
3. Buzzer
4. Operation status indicator
5. Electric heater (unavailable temporarily)
6. Outdoor motor (double speed motor)
7. Compressor



8. 4-way valve
9. Electric expending valve

### D. PCB FUNDAMENTAL FUNCTIONS

#### 1. Led board

There is a LED BOARD in each indoor unit which is connected with Indoor PCB by connecting cable between boards.

Remote-receiving head is for receiving signal from remote controller.

Red lamp is for Running, keeps lighting during running and keeps flickering during failure or defrosting of heat pump function.

Green lamp is for dehumidifying of cooling only function and keeps lighting when the status is running or dehumidifying.

Yellow lamp is for heat pump and keeps lighting during heat pump.

#### 2. Switching board

Pull switch in order is for: Turnoff, Running, Testing and Auto.

Turnoff level: PCB doesn't receive any signal and the unit is in the state of shutdown.

Running level: PCB can receive and carry out the remote signal.

Testing level: Turn to testing level and enter the state of forced cooling running.

When remote signal is heating & energy saving: Rated heating running;

When remote signal is cooling & energy-saving: Rated cooling running.

Auto level: Indoor PCB checks indoor temperature, the unit runs in the state of Auto and the Fan speed is Auto.

#### 3. Operation mode

##### a. AUTO mode

Cooling  $T_{set} = 25^{\circ}\text{C}$ , Heating  $T_{set} = 20^{\circ}\text{C}$

If  $T_{in} > T_{set} + 1^{\circ}\text{C}$  of any indoor unit, select cooling mode. From this time the connotative set temperature is  $25^{\circ}\text{C}$ ; If  $T_{in} \leq T_{set} - 2^{\circ}\text{C}$  for both of indoor units, compressor and outdoor motor stop, and indoor fan motor runs at the set speed; If  $T_{set} - 2^{\circ}\text{C} < T_{in} \leq T_{set} + 1^{\circ}\text{C}$ , keeps the original state.

If  $T_{in} \leq T_{set}$  of any indoor unit, select heating mode. From this time the connotative set temperature is  $20^{\circ}\text{C}$ ; If  $T_{in} \geq T_{set} + 3^{\circ}\text{C}$  for both of indoor units, compressor stops, outdoor motor stops with delay, and indoor fan motor runs as the blowing surplus heat condition; If  $T_{set} < T_{in} < T_{set} + 3^{\circ}\text{C}$ , keeps the original state.

In AUTO state, the indoor unit may stop due to the conflict caused by mode.

In cooling state, the protection function is the same as in cooling mode;

In heating state, the protection function is the same as in heating mode.

##### b. Cooling mode (The range of $T_{set}$ : $16^{\circ}\text{C} \sim 30^{\circ}\text{C}$ , primary set temperature is $24^{\circ}\text{C}$ )

The outdoor fan speed is controlled by indoor units quantity that satisfies operation conditions

under cooling mode. In Cooling mode, the frequency of compressor and the open angle of electric expanding valve are controlled fuzzily after all the input parameters are analyzed. The compressor's frequency converts up or down at 1Hz/second. At rated cooling state the frequency is 56Hz when single unit is turned on, and 86Hz when dual indoor units are turned on. Max. frequency: 54Hz when single indoor unit on, and 90Hz when dual indoor units on.

If  $T_{in} < T_{set}$  for all the four indoor units and cooling mode starts when all the four indoor units are in stand-by state, indoor fan motor runs at the set speed, outdoor unit doesn't work;

If  $T_{in} \geq T_{set}$  for single indoor unit and cooling mode starts when all the four indoor units are in stand-by state, the indoor fan motor, outdoor fan motor and compressor start running and indoor fan motor run at the set speed;

If  $T_{in} < T_{set} - 2^{\circ}\text{C}$ , in running state, the compressor stops, outdoor fan motor stops with delay and indoor fan motor still run at the set speed.

### c. Dehumidifying mode (The range of Tset: $16^{\circ}\text{C} \sim 30^{\circ}\text{C}$ , primary set temperature is $24^{\circ}\text{C}$ )

The outdoor fan speed is subject to indoor units quantity so as to meet the requirement in cooling mode: Low speed for single unit and high speed for multi units. In Dehumidifying mode, the frequency of compressor and the open angle of electric expanding valve are controlled fuzzily after all the input parameters are analyzed. The compressor's frequency converts up or down at 1Hz/second. When the requirement of dehumidifying is met, Max. frequency is: 37Hz when single indoor unit on and 55Hz when dual indoor units on.

When Dehumidifying mode starts from the stand-by state of all the four indoor units, if  $T_{in} \leq T_{set}$  for all the four indoor units, indoor fan motor runs at the low speed, outdoor unit doesn't work; If  $T_{in} > T_{set}$  for single indoor unit, the indoor fan motor, outdoor fan motor and compressor start running and indoor fan motor run at low speed. If  $T_{in} < T_{set} - 2^{\circ}\text{C}$  for all the four indoor units, in running state, the compressor stops, outdoor fan motor stops with delay and indoor fan motor still run at low speed.

### d. Fan Mode

In this mode, indoor fan motor can run at high, mid, low or Auto mode, compressor and outdoor fan motor both stop, indoor fan motor runs at set speed.

Control condition of Auto fan mode:

In cooling and fan modes:

$T_{in} > T_{set} + 4^{\circ}\text{C}$ , high fan speed automatically;

$T_{set} + 2^{\circ}\text{C} \leq T_{in} \leq T_{set} + 4^{\circ}\text{C}$ , mid fan speed automatically;

$T_{in} < T_{set} + 2^{\circ}\text{C}$ , low fan speed automatically;

In heating mode:

$T_{in} < T_{set} - 4^{\circ}\text{C}$ , high fan speed automatically;

$T_{set} - 2^{\circ}\text{C} \geq T_{in} \geq T_{set} - 4^{\circ}\text{C}$ , mid fan speed automatically;

$T_{in} > T_{set} - 2^{\circ}\text{C}$ , low fan speed automatically;

### e. Heating mode (The range of Tset: $16^{\circ}\text{C} \sim 30^{\circ}\text{C}$ , primary set temperature is $24^{\circ}\text{C}$ )

The speed of outdoor fan motor is subject to the quantity of indoor units so as to meet the requirement in heating mode: low speed for single unit; high speed for multi units. Under heating

mode, the frequency of compressor and the open angle of electric expansion valve are controlled fuzzily after all the input parameters are analyzed. The compressor's frequency converts up or down at 1Hz/second. Under rated heating mode, the frequency is 62.5Hz when single indoor unit is on and 89Hz when multi indoor units are on. When the requirement of heating mode is met, Max. frequency is: 58Hz when single indoor unit on and 90Hz when dual indoor units on.

When Heating mode acts from the stand-by state of all the four indoor units, if  $T_{in} > T_{set} + 1^{\circ}\text{C}$  for all the four indoor units, indoor fan motor doesn't run, outdoor unit doesn't work; If  $T_{in} \leq T_{set} + 1^{\circ}\text{C}$  for single indoor unit, the outdoor fan motor, 4-way reserving valve and compressor start running and indoor fan motor run at the set anti-cool-air speed; If  $T_{in} \geq T_{set} + 2^{\circ}\text{C}$  for all the four indoor units, in running state, the compressor stops, outdoor fan motor stops with delay and indoor fan motor still run blowing surplus heat.

Defrosting condition and process:

The PCB receives the  $T_{out}$ ,  $T_{con}$  and lasting time of heating, then controls the defrosting cycle through estimating the frosting condition by fuzzy calculation, so as that the best heating effect can be achieved. After turning on one indoor unit for 47 minutes and  $T_{con} \leq -5^{\circ}\text{C}$ , dehumidifying function starts. The indoor unit turned on later will enter into dehumidifying mode with the former units together. The defrosting process is as follows: When defrosting starts, the running LED of indoor unit keeps flashing, the compressor stops, the indoor fan motor stops, outdoor fan motor and 4-way valve delay to stop. 10 seconds later compressor starts and defrosting starts. After defrosting is finished, the compressor will stop; 30 seconds later 4-way valve is on. Another 30 seconds later, compressor and outdoor fan motor keep running, running LED of indoor unit stop flashing and the indoor fan motor runs at the set anti-cool air mode.

Anti-cool air condition:

After compressor starts running,  $T_{eva}$  is detected. If  $T_{eva} \geq 41^{\circ}\text{C}$  or compressor starts running for 3 min, indoor fan motor runs at the set speed.

Blowing surplus heat:

Blowing surplus heat starts after compressor starts running for at least one minute. During this process the indoor fan motor runs at the smallest speed for 90 seconds then stops.

Auxiliary heater working condition: (Unavailable temporarily for this model)

When indoor fan motor is running at high or medium speed, and  $T_{in} \leq 22^{\circ}\text{C}$  or  $T_{eva} \leq 46^{\circ}\text{C}$ , auxiliary heater is switched on; If compressor stops, indoor fan motor runs at low speed or not running or  $T_{in} \geq 25^{\circ}\text{C}$  or  $T_{eva} \geq 50^{\circ}\text{C}$ , auxiliary heater stops. After the auxiliary heater is switched off, it cannot be switched on for at least 2 minutes.

#### 4. Protection functions

a. General protection function for all the modes

Delay protection for Compressor:

Compressor's starting interval should be more than three minutes;

Discharge temperature protection of compressor:

When the discharge temperature of compressor  $T_{dis} \geq 115^{\circ}\text{C}$ , compressor stops for 3 minutes. Later if  $T_{dis} \leq 95^{\circ}\text{C}$ , compressor starts. When  $T_{dis} \geq 95^{\circ}\text{C}$ , the frequency is not allowed to rise. When  $T_{dis} \geq 106^{\circ}\text{C}$ , the frequency will be decreased. If the temperature keeps rising, the frequency will be switched to the lower frequency segment.

Module protection:

In inverter module, there are overload protection, anti high temperature protection, short circuit protection and low power supply protection. In case of the above protection, the unit will be switched off automatically.

b. Protection function in Cooling or Dehumidifying modes

Anti-freezing function:

Under Cooling and Dehumidifying modes, if the compressor starts running for ten minutes and five seconds and it detects  $T_{eva} < -2^{\circ}\text{C}$ , anti-freezing works. When setting single indoor unit run, compressor runs with frequency lowering down and adjusting open angle of electric expanding heater. When setting dual indoor units run, compressor stops and open angle of electric expanding heater is adjusted.

Current overload protection

In Cooling or Dehumidifying mode, when total current exceeds 16A, frequency rising is forbidden; When total current exceeds 18A, compressor and outdoor fan motor stop, start running 3 minutes later.

c. Protection function in Heating mode

Current overload protection:

In Heating mode, when total current exceeds 16A, frequency rising is forbidden; When total current exceeds 18A, compressor and outdoor motor stop, start running 3 minutes later.

Anti high temperature protection:

The PCB adjusts the frequency value of compressor and the open angle of electric expansion valve according to the value of  $T_{eva}$ . If it detects  $T_{eva} \geq 65^{\circ}\text{C}$ , single indoor unit runs and open angle of electric expanding valve is adjusted. If dual indoor units runs together, compressor stops and outdoor motor stops with delay, indoor fan motor stops under blowing surplus heat mode and open angle of electric expanding valve is adjusted. 3 minutes later, if it detects  $T_{eva} \leq 52^{\circ}\text{C}$ , heating mode starts again.

Pre-heat belt protection:

When the ambient temperature of the outdoor unit  $T_{out}$  is over low and affects the normal work of the compressor, the pre-heat belt starts working for 15 minutes firstly, then the unit starts running normally.

5. Energy saving function

During running, the running power is around 70% of full power.

6. Memory function

## Bird Series

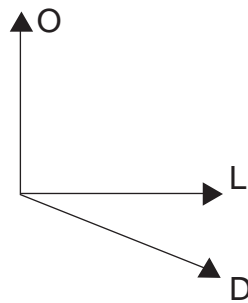
---

After the power is cut suddenly, if the power is connected, the unit will restart in the old mode by memory function.

### OTHER CONTROL:

Swing motor (Stepping motor)

Swing, refer to the figure below:



### 7. Sleeping mode

- Under Cooling or Dehumidifying mode, 1 hour after setting sleep timer,  $T_{set}$  adds  $1^{\circ}\text{C}$  automatically; After another 1 hour, another  $1^{\circ}\text{C}$  is added. Fan speed is at low level.
- In Heating mode, 1 hour after setting sleep timer,  $T_{set}$  lowers  $1^{\circ}\text{C}$  automatically; After another 1 hour, another  $1^{\circ}\text{C}$  is lowered. Fan speed is at low level.

### 8. Timing function

Timer for turning on:

The unit is stopped when the timer for turning on acts. When it is time to turn on, the PCB will act in the set mode. The distance of setting twice is 0.5 hour and time range is 0.5-24 hours.

Timer for turning off:

Set the timer for turning off function when the unit is at the state of stop, When it is time to turn off, the unit will be switched off. The distance of setting twice is 0.5 hour and time range is 0.5-24 hours.

### 9. Control function of electric expanding valve

The open angle of electric expanding valve can be controlled freely within 0~500 steps.

In the initial time when it is powered on, the electric expanding valve will recover to the state of turning off. Then it will switch on or off according to the requirement of indoor units.

The PCB for four multi split can control 4 electric expanding valves separately, and adjusts the open angle according to the required cooling or heating capacity by the four indoor units and the actually supplied cooling or heating capacity.

### 10. Conflict

Under cooling, dehumidifying and fan mode, no conflict occurs between A and B indoor units or C and D indoor units. There are conflicts between heating mode and other modes. When conflict

## Bird Series

---

occurs, the later turned on indoor unit buzzes for one time and then this indoor unit is turned off. All indicators on LED board are switched off.

### 11. Malfunction display

Indication method of indoor unit malfunction:

There are 3 indicators for indoor unit failure, one is running indicator light (red) on the LED board; another two are D1 (green) and D2 (yellow) on the PCB board of indoor unit. Green light is for communication. When the communication is normal, the yellow light keeps flashing every five seconds; Yellow light is for the indicator for sensor failure. If the sensor is in good condition, this light doesn't light; The running indicator light on the LED board keeps lighting when the unit runs normally. It keeps flashing when defrosting starts or failure happens on outdoor unit. It remains lighting after defrosting is finished or the failure is removed.

Indication method of outdoor unit failure:

There are 3 indicators for outdoor unit failure. When the compressor stops, the corresponding failure of indicator lights are as follows:

| No. | Yellow light | Red light | Green light | Content                                     |
|-----|--------------|-----------|-------------|---|
| 1   |              |           | Light       | Faiure of ambient temperature sensor        |
| 2   |              | Light     |             | Failure of heat-exchange temperature sensor |
| 3   |              | Flashing  | Flashing    | Over high temperature of compressor         |
| 4   | Light        |           |             | Failure of A valve temperature sensor       |
| 5   | Light        |           | Light       | Failure of B valve temperature sensor       |
| 6   | Flashing     |           |             | Module protection                           |
| 7   | Light        | Light     | Light       | Failure of discharge temperature sensor     |

## 4.10 Troubleshooting

### Troubleshooting methods of Inverter models

There are many reasons that outdoor unit can not start: broken module, abnormal communication between indoor and outdoor, broken sensor of indoor and outdoor, open-circuited overload protector, broken PCB, etc, the following are specific diagnosing and shooting methods:

1. Broken module: check if the voltage between P and N of power module reaches 310 VDC after switching on power; if there is no value, please check if rectifier, induction coil and capacitor of outdoor main circuit work properly, then check wires connection and PTC resistance, PTC resistance should be between  $30\ \Omega \sim 60\ \Omega$ , both open-circuit and short-circuit is abnormal. If voltage is 310 VDC, but the red LED of outdoor PCB is not lit, check connection of 10-core signal wires between PCB and power module, if connection is ok, but red LED is still not lit, power module is broken.

If red LED is lit, but compressor doesn't work, remove U, V and W wires of compressor, turn on the machine again, if outdoor fan works properly, that means power module is broken.

Note: When you change power module, mop up heat emitting grease on the power module and heat exchange fins.

2. Broken sensors of indoor and outdoor unit: sensors are very important parts in inverter controlling.

(1) In COOL and DRY mode, if machine stops after running for a few minutes.

- a. Check if indoor tube sensor is broken or if low ambient temp leads to indoor anti-freezing protection.
- b. Check if outdoor tube sensor is broken, or the sensed temp is too high, when  $T_{tb}$  (outdoor tube sensor)  $> 65^{\circ}\text{C}$ , compressor will stop, if  $T_{tb} < 58^{\circ}\text{C}$ , compressor will run again.
- c. Check if discharge temp is too high, or discharge temp sensor is broken, when  $T_{dis} > 115^{\circ}\text{C}$ , compressor stops, when  $T_{dis} < 92^{\circ}\text{C}$ , compressor will run again.
- d. Check if overload protector is open-circuited.

(2) HEAT mode

- a. If compressor doesn't start, indoor fan can not run, it's communication error, check if wires connection between indoor and outdoor is ok, check if earth line is firmly grounded.
- b. High temp. protection, when  $T_{in}$  (indoor tube sensor)  $> 65^{\circ}\text{C}$ , compressor stops, when  $T_{in} > 52^{\circ}\text{C}$ , compressor will run again, if it doesn't work like this, change the indoor tube sensor
- c. Discharge temp. protection and overload protection are same as in COOL mode.



## Protection function of Single-Split Inverter models

### 1. Discharge temp. protection

When  $T_{dis} \geq 115^{\circ}\text{C}$ , compressor stops;

When  $T_{dis} \leq 90^{\circ}\text{C}$  and compressor stops for over 3 min, compressor will run again.

### 2. Indoor anti-freezing protection

When  $T_{in}$  (indoor tube sensor)  $\leq -1^{\circ}\text{C}$ , compressor stops;

When  $T_{in} \geq 6^{\circ}\text{C}$  and compressor stops for over 3 min, compressor will run again.

### 3. Current protection

When  $I_t \geq D$ , compressor stops and outdoor fan will stop after 30 sec.

COOL mode : 32model :  $D=10\text{A}$  ; 25model :  $D=8\text{A}$

HEAT mode : 32model :  $D=13\text{A}$  ; 25model :  $D=10\text{A}$

### 4. Overload protection

When  $62^{\circ}\text{C} \leq T_{con}$ , indoor fan runs at set speed, compressor stops. Note:  $T_{con}$ , in COOL mode, means outdoor tube temp. in HEAT mode, means indoor tube temp.

### 5. LED display of defects

| LED1        | LED2      | LED3         | D1 | D2    | D3    | Defects                                  |
|-------------|-----------|--------------|----|-------|-------|--|
| Green On    |           |              |    |       |       | Compressor stops and there are defects   |
|             |           | Yellow On    |    |       |       | Defective outdoor ambient sensor         |
|             | Red On    |              |    |       |       | Defective outdoor tube sensor            |
| Green Flash |           |              |    |       |       | Protection signal from module            |
|             | Red Flash | Yellow Flash |    |       |       | Compressor overload protection functions |
| Green On    | Red On    | Yellow On    |    |       |       | Defective discharge temp. sensor         |
|             |           |              | On |       |       | Compressor runs                          |
|             |           |              |    | Flash |       | Normal communication, if not, abnormal   |
|             |           |              |    |       | Flash | Defective indoor sensor                  |

### 6. Display LEDs of outdoor unit is only effective when compressor stops.

- ① Compressor stops and it's defective, green LED is lit.
- ② When outdoor ambient temp sensor is defective ,yellow LED is lit.
- ③ When outdoor tube sensor is defective ,red LED is lit.
- ④ When module is protected ,green LED flashes.
- ⑤ When compressor is overloaded, red and yellow LEDs flash simultaneously.



## Bird Series

---

- ⑥ When discharge temp sensor is defective, green, red and yellow LEDs are lit.
- ⑦ Indoor D1 is lit when compressor runs.
- ⑧ Indoor D2 is communication indication, it flashes means normal, if not, abnormal.
- ⑨ Indoor D3 is tube sensor indication LED, it flashes when there is a defect.

### 7. Brief of power module

#### a. function introduction of signal wire

No 1 : Negative end of W ;    No 2 : Positive end of W ;

No 3 : Negative end of V ;    No 4 : Positive end of V ;

No 5 : Negative end of U ;    No 6 : Positive end of U ;

No 7 : Earth line ;                No 8 : +5V line ;

No 9 : +12V line ;                No 10 : Signal protection wire of module ;

#### b. Protection of module

When power module is overheated, over-currented and low voltage protected, there is a signal output at mini-second level from power module.

#### c. Cautions when changing module.

1) Heat emitting grease should be mopped on heat exchanger fins evenly to provide efficient effect, in fixing and removing module, please be very careful to handle it.

2) Follow below procedures to fix function module.

\* Position two screws

\* Use torch screw-driver to fix the module

3) Use M4 screw, position it with a torch of  $0.196\text{N} \cdot \text{m}$ , then fix it with a torch of  $0.78\sim 0.98\text{N} \cdot \text{m}$ .

4) Be careful with the capacitors, coil and iron core which stick out of the module surface.

## Troubleshooting methods of Bird Dual-Split and Bird Quadruple-Split Inverter models

Display of defects in indoor unit:

There are 3 indoor LEDs which can display defects, one is the red LED (RUN) on receiving PCB, another two are green LED D1 and yellow LED D2, green LED is the communication lamp. When communication is normal, it flashes at a cycle of 5 sec, yellow LED is indication lamp of defective sensor, it is not lit when sensor functions normally, red LED on receiving board is lit in normal running, it flashes only when machine begins to defrost or outdoor unit is abnormal.

Display of defects in outdoor unit:

there are 3 indication LEDs in outdoor unit, when compressor stops, LEDs have following indications of defects.

| No. | Yellow | Red   | Green | Content                          |
|-----|--------|-------|-------|----------------------------------|
| 1   |        |       | lit   | Defective ambient sensor         |
| 2   |        | lit   |       | Defective tube sensor            |
| 3   |        | flash | flash | Compressor overload              |
| 4   | lit    |       |       | Defective temp sensor of valve A |
| 5   | lit    |       | lit   | Defective temp sensor of valve B |
| 6   | flash  |       |       | Module protection                |
| 7   | lit    | lit   | lit   | Defective discharge temp. sensor |

There are many reasons that outdoor unit can not start: broken module, abnormal communication between indoor and outdoor, broken sensor of indoor and outdoor, open-circuited overload protector, broken PCB, etc, the following are specific diagnosing and shooting methods:

1. Broken module: check if the voltage between P and N of power module reaches 310 VDC after switching on power; if there is no value, please check if rectifier, induction coil and capacitor of outdoor main circuit work properly, then check wires connection and PTC resistance, PTC resistance should be between  $30\ \Omega \sim 60\ \Omega$ , both open-circuit and short-circuit is abnormal. If voltage is 310 VDC, but the red LED of outdoor PCB is not lit, check connection of 10-core signal wires between PCB and power module, if connection is ok, but red LED is still not lit, power module is broken.

If red LED is lit, but compressor doesn't work, remove U, V and W wires of compressor, turn on the machine again, if outdoor fan works properly, that means power module is broken.

Note: when you change power module, mop up heat emitting grease on the power module and heat exchange fins.

2. If machine can not make cool ,make heat or electric expansion valve can not be opened after turning on the machine, please check as below:

- a. Check resistances of all indoor sensors.
- b. Check if communication between indoor and outdoor is normal ,if indoor communication LED D1 flashes.
- c. If communication is abnormal, please check PCBs and connection first.

3. Broken sensors of indoor and outdoor unit: sensors are very important parts in inverter controlling.

(1) In COOL and DRY mode, if machine stops after running for a few minutes or electric expansion valve can not open.

- a. Check if indoor tube sensor is broken or if low ambient temp leads to indoor anti-freezing protection.
- b. Check if outdoor tube sensor is broken, or the sensed temp is too high. When  $T_{tb}$  (outdoor tube sensor) $>65^{\circ}\text{C}$ , compressor will stop, if  $T_{tb}<58^{\circ}\text{C}$ , compressor will run again.
- c. Check if discharge temp is too high, or discharge temp sensor is broken,when  $T_{dis}>115^{\circ}\text{C}$ , compressor stops, when  $T_{dis}<92^{\circ}\text{C}$ , compressor will run again.
- d. Check if overload protector is open-circuited.

(2) In HEAT mode, if heating capacity is not enough or electric expansion valve can not open.

- a. Check if resistance of indoor tube sensor is short-circuited or smaller than required.
- b. Check if resistance of indoor room sensor is short-circuited or smaller than required.

4. Over current protection

In COOL and DRY mode, if total current exceeds 20A, machine stops frequency increase; if it passes 22 A, it stops compressor and outdoor fan for 3 min, then it restarts.

In HEAT mode, if total current exceeds 20A, machine stops frequency increase; if it passes 22 A, it stops compressor and outdoor fan for 3 min, then it restarts.

If outdoor unit starts and stops frequently, please check all the above items ,then check if over current testing circuit is normal.

5. Compressor can not start

- a. Examine if outdoor PCB is live, if not, check if there is an output of 5V, 12V from power module, if not ,check if P and N of module has a voltage of 310VDC, if there is, but no 5V and 12V output from module, module is broken; if not ,check if connections are correct , if rectifier and fuse is normal .
- b. Check if communication between indoor and outdoor is normal, tube sensor of indoor and outdoor is open-circuited or short-circuited.
- c. If outdoor fan can start, but compressor can not start, remove 3 wires U,V and W of compressor, then test the voltage between these wires when machine is live ,be careful to do this, if normal,

## Bird Series

---

compressor is broken, if not, power module is broken.

- d. Overload protector of compressor functions, outdoor green LED and red LED flashes simultaneously.

## Troubleshooting methods of Bird Inverter models (refrigeration system)

Note: the normal pressure range of inverter models is as following, low pressure 0.4-0.6MPa, high pressure 1.6-2.4MPa, if pressures are not in this range, defects happened, following is the possible reasons.

| No. | Phenomenon  | Checking precedures  | Solution  |
|-----|---|--|---|
| 1   | In cooling, room is not cold<br><br>In heating, room is not warm                  | <ol style="list-style-type: none"> <li>1. Check if room is too big or door and window is open</li> <li>2. Check if outdoor unit is in proper position, if air outlet is blocked or outdoor unit is exposed directly in sunshine</li> <li>3. Check if indoor installation is in proper position and air outlet is not blocked</li> <li>4. Check if filters and condenser are dirty</li> <li>5. Check if refrigeration circuit is blocked</li> <li>6. Check if refrigerant is leaked, normal low pressure is between 0.4-0.6MPa, normal high pressure is between 1.6-2.4MPa</li> <li>7. In cooling mode, if outdoor temp is too high; In heating mode, if outdoor temp is too low</li> </ol>   | <p>Close door and window</p> <p>Adjust installation position</p> <p>Adjust installation position</p> <p>Clean</p> <p>Change capillary or other blocked parts</p> <p>Recharge refrigerant</p> <p>Normal result</p>   |
| 2   | Compressor is overheated, or stop after started a few minutes, or frequently stop | <ol style="list-style-type: none"> <li>1. Check if outdoor unit is installed properly, air outlet is not blocked and exposed in the sunshine</li> <li>2. Check if outdoor temp is too high</li> <li>3. Check if filters and condenser are dirty</li> <li>4. Check if outdoor is running properly, or air outlet is not blocked</li> <li>5. Check if refrigeration circuit is blocked</li> <li>6. Check if power supply, power cord and switch conform with relative regulations</li> <li>7. Check if refrigerant is leaked, normal low pressure is between 0.4-0.6MPa, normal high pressure is between 1.6-2.4MPa</li> <li>8. Check electric system</li> <li>9. Check outdoor power module</li> <li>10. Check if compressor is broken</li> </ol> | <p>Adjust installation position</p> <p>Normal result</p> <p>Clean</p> <p>Check if power supply of motor is ok, or change motor</p> <p>Change capillary or other blocked parts</p> <p>Contact electrician</p> <p>Recharge refrigerant</p> <p>Change broken parts</p> <p>Change broken one</p> <p>Change compressor</p> |
| 3   | Freezing evaporator   | <ol style="list-style-type: none"> <li>1. Check if filters and condenser are dirty</li> <li>2. Check if indoor is installed properly, air outlet is not blocked</li> <li>3. Check if indoor fan runs properly or air outlet is blocked</li> <li>4. Check if refrigerant is leaked, normal pressure is between 0.4-0.6MPa</li> <li>5. Check if tube sensor is broken</li> <li>6. Check if indoor PCB is broken</li> <li>7. Check if wires connection is proper</li> </ol>   | <p>Clean</p> <p>Adjust installation position</p> <p>Check power supply circuit of indoor motor is ok, or chage motor</p> <p>Recharge refrigerant</p> <p>Change sensor</p> <p>Change PCB</p> <p>reconnect wires</p>  |
| 4   | Abnormal noise  | <ol style="list-style-type: none"> <li>1. Indoor fan is not in its position</li> <li>2. Outdoor fan blades touch structure parts</li> <li>3. Pipes are touching</li> <li>4. Pipes and outdoor are resonating</li> <li>5. Compressor runs reversely</li> <li>6. Abnormal outdoor noise</li> </ol>   | <p>Adjust position</p> <p>Adjust position</p> <p>Check if damping rubber of dampers are in their</p> <p>Change wires connection</p> <p>Wrap compressor with insulation cotton</p>   |

## Troubleshooting For Bird Triple Split Inverter air conditioner

| No. | Phenomenon   | Failure and troubleshooting  |
|-----|--|--|
| 1   | Red indicator light on outdoor PCB keeps lighting              | Failure of outdoor ambient temperature sensor. Insert it well or replace it.   |
| 2   | Yellow indicator light on outdoor PCB keeps lighting           | Failure of heat exchanger temperature sensor. Insert it well or replace it.  |
| 3   | Red and yellow indicator lights on outdoor PCB keep lighting   | Failure of discharge temperature sensor. Insert it well of replace it.   |
| 4   | Yellow and green indicator lights on outdoor PCB keep lighting | Failure of return-air temperature sensor. Insert it well or replace it.  |
| 5   | Red indicator light on outdoor PCB keeps flashing              | Communication failure. Check the green indicator light on indoor PCB. If it doesn't flash, then whether the communication cable is well connected. If the several communication-used carbon-coated resistances R106, R109, R110 and R103 touch each other, then separate them. Otherwise, replace the PCB. |
| 6   | Yellow indicator light on outdoor PCB keeps flashing           | Anti-freezing protection. The outdoor unit can revert to the normal state automatically. If it fails to revert, then change the indoor tube temperature sensor.  |
| 7   | Red and yellow indicator lights on outdoor PCB flashing        | Anti high temperature protection. The outdoor unit can revert to the normal state automatically. If it fails to revert, change the indoor tube temperature sensor.   |
| 8   | Green indicator lights on outdoor PCB flashing                 | Over high temperature of compressor, the discharge temperature $\geq 110^{\circ}\text{C}$ . It reverts automatically three minutes later.  |
| 9   | Red and green indicator lights on outdoor PCB flashing         | Current overload. It may be caused by the over big current, in this case it can revert automatically three minutes later; If it fails to revert, change the outdoor PCB.   |
| 10  | Yellow and green indicator lights on outdoor PCB flashing      | Overload. It is caused by the disconnection of overload protector of compressor. Unfasten the top cover of compressor, it can revert automatically; Otherwise, replace the overload protector.   |
| 11  | Red, yellow and green indicator lights on outdoor PCB flashing | Module protection. It is caused by the over heat module or over current and usually it can revert automatically. If it keeps flashing for long time, then replace the module and pain heat-radiating cream, or replace the outdoor PCB.  |
| 12  | Yellow indicator lights on indoor PCB flashing                 | Failure of indoor ambient temperature sensor or indoor liquid tube temperature sensor. Insert it well or replace it.   |
| 13  | Red indicator lights on indoor PCB flashing                    | It is in the state of outdoor defrosting. Normal.  |

Note: On the outdoor PCB, Red indicator light is LED1, yellow is LED2, green is LED3. If the unit doesn't cool or heat, you can check with the above phenomenon and remove the problem accordingly.

## Troubleshooting methods of Bird Dual-Split and Quadruple-Split Inverter models(system part)

1. The normal low pressure of air conditioner is around 0.4~0.6Mpa in ambient temp of 30°C.  
If pressure is lower than this, possible reasons are :
  - (1) Insufficient refrigerant.
  - (2) Filter blocked.
  - (3) Air outlet is blocked.If pressure is higher than this, possible reasons are:
  - (1) Insufficient heat exchange condition of outdoor unit.
  - (2) Charged excessive refrigerant.
  - (3) Incondensable air in the system.
  - (4) Broken compressor.If there is no pressure, it means all refrigerant leaked.
  
2. The normal high pressure is around 1.6~2.2Mpa in ambient temp of 30°C.  
If pressure is lower than this, possible reasons are :
  - (1) Insufficient refrigerant .
  - (2) Filters blocked.
  - (3) Broken compressor.If pressure is higher than this, possible reasons are :
  - (1) Insufficient heat exchange condition of outdoor unit.
  - (2) Charged excessive refrigerant.
  - (3) Incondensable air in the system .
  
3. If sound emitted by compressor is lower than normal one, possible reasons are :
  - (1) Insufficient refrigerant.
  - (2) Filters blocked.
  - (3) Refrigerant leaked.
  - (4) Insufficient heat exchange condition of indoor unit.
  - (5) Broken compressor.If sound emitted by compressor is higher than normal one, possible reasons are :
  - (1) Insufficient heat exchange condition of outdoor unit.
  - (2) Charged excessive refrigerant.
  - (3) Incondensable air in the system.
  
4. In normal condition, suction pipe of compressor has low temp, it dewes on its surface.  
If suction pipe is very warm, possible reasons are :

- (1) Refrigerant leaked.
- (2) Insufficient heat exchange condition in outdoor unit.
- (3) Broken compressor.

If suction pipe doesn't dew on its surface, possible reasons are :

- (1) Insufficient refrigerant .
- (2) Filters blocked .
- (3) Incondensable air in the system.

If suction pipe has lower temp than normal one, possible reasons are :

- (1) Insufficient heat exchange condition of indoor unit.
- (2) Charged excessive refrigerant.

5. In normal condition , discharge temp of compressor is high.

If discharge temp is lower than normal one , possible reasons are :

- (1) Insufficient refrigerant.
- (2) Filters blocked.
- (3) Refrigerant leaked.
- (4) Insufficient heat exchange condition of indoor unit.
- (5) Broken compressor.

If discharge temp is higher than normal one, possible reasons are :

- (1) Insufficient heat exchange condition of outdoor unit.
- (2) Charged excessive refrigerant.
- (3) Incondensable air in the system.

6. In normal condition , shell temp of compressor is around 100°C.

If shell temp is too high, possible reasons are :

- (1) Insufficient refrigerant.
- (2) Filters blocked.
- (3) Insufficient heat exchange condition of outdoor unit.
- (4) Incondensable air in the system .

If shell temp is low and dews on its surface, possible reasons are :

- (1) Insufficient heat exchange condition of outdoor unit.
- (2) Charged excessive refrigerant.

7. In normal condition, condenser is very hot.

If temp of condenser is too low, possible reasons are :

- (1) Insufficient refrigerant.
- (2) Filters blocked.
- (3) Refrigerant leaked.
- (4) Insufficient heat exchange condition of indoor unit.



(5) Broken compressor.

If temp of condenser is higher than normal one, possible reasons are :

- (1) Insufficient heat exchange condition of outdoor unit.
- (2) Charged excessive refrigerant .
- (3) Incondensable air in the system.

8. In normal condition, evaporator is cool.

If it dews too much or frosts on the surface, possible reasons are :

- (1) Insufficient refrigerant.
- (2) Filters blocked.
- (3) Insufficient heat exchange condition of indoor unit.
- (4) Charged excessive refrigerant .

If evaporator is not cool enough, it dews very little on the surface, possible reasons are :

- (1) Insufficient heat exchange condition of outdoor unit.
- (2) Incondensable air in the system.

If evaporator is hot, possible reasons are :

- (1) Refrigerant leaked.
- (2) Broken compressor.

9. In normal condition, filters are a little bit overheated.

If filter is dewed or frosted, possible reasons are :

- (1) Insufficient refrigerant.
- (2) Filters blocked.

10. In normal condition, temp of capillary is same as ambient temp.

If capillary is overcooled or frosted, possible reasons are :

- (1) Insufficient refrigerant.
- (2) Filters blocked.

11. In COOL mode, but room is not cool enough, possible reasons are :

- (1) Too much heat resources.
- (2) Inappropriate installation position.
- (3) Filters are not cleaned for a long time and blocked.
- (4) Refrigerant circuit is blocked and leaked.

12. Compressor can run, but outlet air of indoor is not cool, possible reasons are :

- (1) Too high ambient temperature, inappropriate cooling capacity of air conditioner.
- (2) Condenser is very dirty and blocked.
- (3) Inappropriate installation position.

- (4) Refrigerant system is blocked.
- (5) Electric circuit is defective.

13. In COOL mode, compressor stops immediately after it starts, possible reasons are:

- (1) High ambient temperature, compressor is overloaded and stopped.
- (2) Outdoor unit is installed in inappropriate position, outdoor unit is exposed to sunshine, or its air outlet is blocked.
- (3) Abnormal high and low voltage, compressor can not start or it started but overloaded and stopped immediately.
- (4) Capacity of power supply is not enough, voltage loss is very big, and current is also big ,this will lead to overload protection.
- (5) Capacitor is defective or insufficient contact with terminals ,compressor can not run properly.

14. Fan motor can not run, possible reasons are :

- (1) Terminal contact is insufficient, or wires is broken.
- (2) Thermostat is defective.
- (3) Capacitor is broken and terminal contact is insufficient.
- (4) Wires are broken, no power supply to fan motor.

15. Fan motor can run ,compressor can not run, possible reasons are :

- (1) Voltage is too high or too low, current is big, this leads to action of overload protector.
- (2) Capacity of power supply is too small, voltage loss is too big, compressor is overloaded and stopped .
- (3) Electric circuit is defective , compressor can not run.
- (4) Broken compressor.

16. Compressor can run, but there is no cool air (hot air) in COOL(HEAT) mode, possible reasons are :

- (1) Refrigerant leaked.
- (2) Refrigerant circuit blocked.
- (3) Broken compressor.

17. There is hot air in HEAT mode, but room is not warm, possible reasons are :

- (1) Room is too big, heating capacity of air conditioner is too small ,it can not raise room temperature.
- (2) Low indoor temperature.
- (3) Inappropriate installation position, air flow is blocked.
- (4) Filters are blocked.

## Bird Series

---

18. In HEAT mode, compressor stops immediately after it starts, possible reasons are :

- (1) Inappropriate installation position, air flow is blocked ,insufficient heat exchange condition of outdoor unit.
- (2) Higher or lower voltage, compressor is overloaded and protected.
- (3) Capacity of power supply is not enough, voltage loss is too big, over current protects compressor.
- (4) Capacitor is defective or terminal contact is insufficient, compressor can not run.

19. There is abnormal noise in air conditioner running, possible reasons are :

- (1) Indoor fan is installed improperly, adjust and install again.
- (2) Tubes are touching each other, adjust them.
- (3) Pipes and machine resonate, check if damping rubber ring and damping mud is in correct position, otherwise change or add one.
- (4) Compressor runs reversely , randomly change two wires connection of U,V and W.
- (5) Piercing noise from outdoor unit, wrap compressor and pipes with insulation cotton.