

GD Midea Refrigeration Equipment Co.,Ltd

MULTI SPLIT TYPE, HEAT PUMP AIR CONDITIONERS

Technical service manual

R410A Multi DC inverter

220~240V-1Ph-50Hz

Outdoor units Models

**M2OC-14HRDN1
M2OC-14HRDN1-Q
M2OC-18HRDN1
M2OC1-18HRDN1-Q
M3OC1-21HRDN1-Q
M3OC-27HRDN1
M3OC1-27HRDN1-Q
M4OC-24HRDN1-Q
M4OC1-27HRDN1-Q
M4OC-27HRDN1
M4OC-36HRDN1-Q
M5OA-36HRDN1-Q**

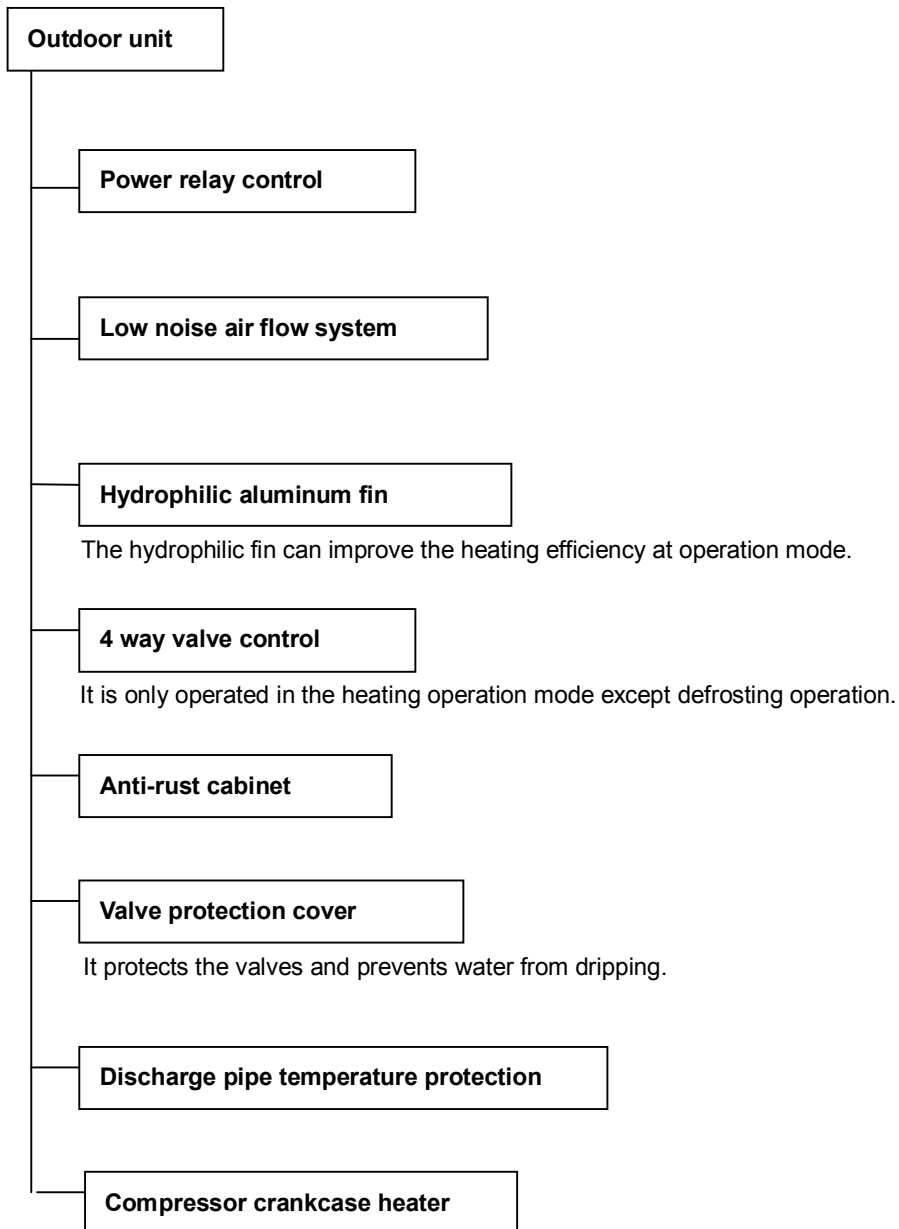
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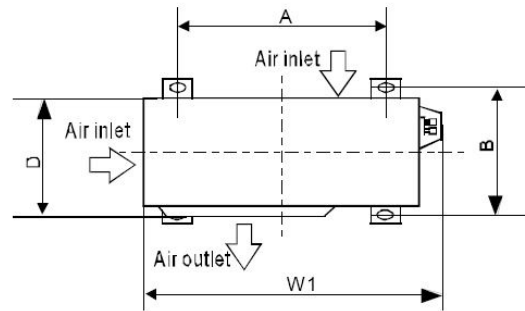
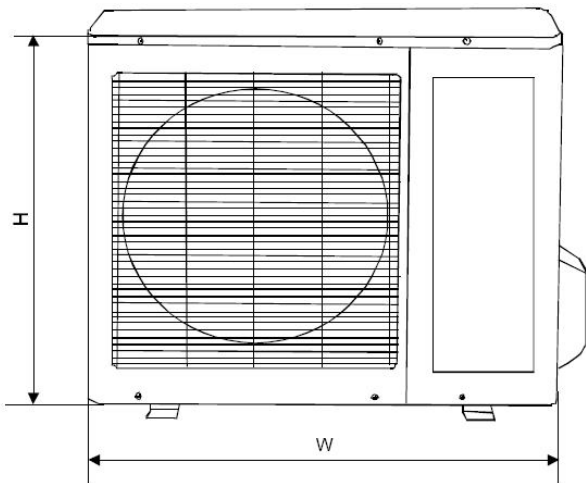
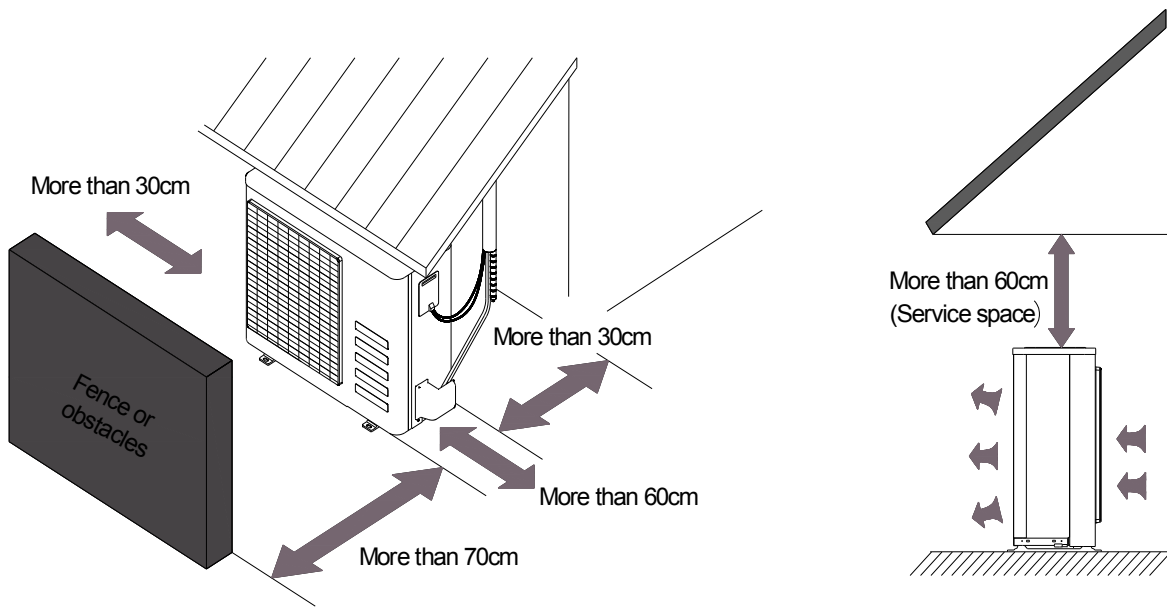
1. General information of Outdoor Units

| Model name | Dimension (mm) | Net/Gross weight (kg) | Compressor |
|----------------------------------|----------------|-----------------------|----------------|
| M2OC-14HRDN1 | 760*590*285 | 39/41 | DA108X1C-20FZ3 |
| M2OC-14HRDN1-Q | 760*590*285 | 39/41 | DA108X1C-20FZ3 |
| M2OC-18HRDN1 | 845*700*320 | 57.5/61.5 | C-6RVN93H0N |
| M2OC1-18HRDN1-Q | 845*700*320 | 53.5/57 | DA130S1C-20FZ |
| M3OC1-21HRDN1-Q | 845*700*320 | 55/60 | DA130S1C-20FZ |
| M3OC-27HRDN1 | 845*700*320 | 59/62 | C-6RZ146H1A |
| M3OC1-27HRDN1-Q | 845*700*320 | 57/60.5 | DA150S1C-20FZ |
| M4OC-24HRDN1-Q | 845*700*320 | 56/60 | DA150S1C-20FZ |
| M4OC-27HRDN1 | 900*860*315 | 73/78 | TNB220FLHMC-L |
| M4OC1-27HRDN1-Q | 900*860*315 | 73/78 | DA250S2C-30MT |
| M4OC-36HRDN1-Q (220057200010) | 990*965*345 | 86/90 | TNB306FPGM |
| M4OC-36HRDN1-Q (220057200011) | 990*965*345 | 86/90 | TNB306FPGMC-L |
| M5OA-36HRDN1-Q (220057100360) | 990*965*345 | 86.5/91 | TNB306FPGM |
| M5OA-36HRDN1-Q (220057100361) | 990*965*345 | 86.5/91 | TNB306FPGMC-L |

2. Features



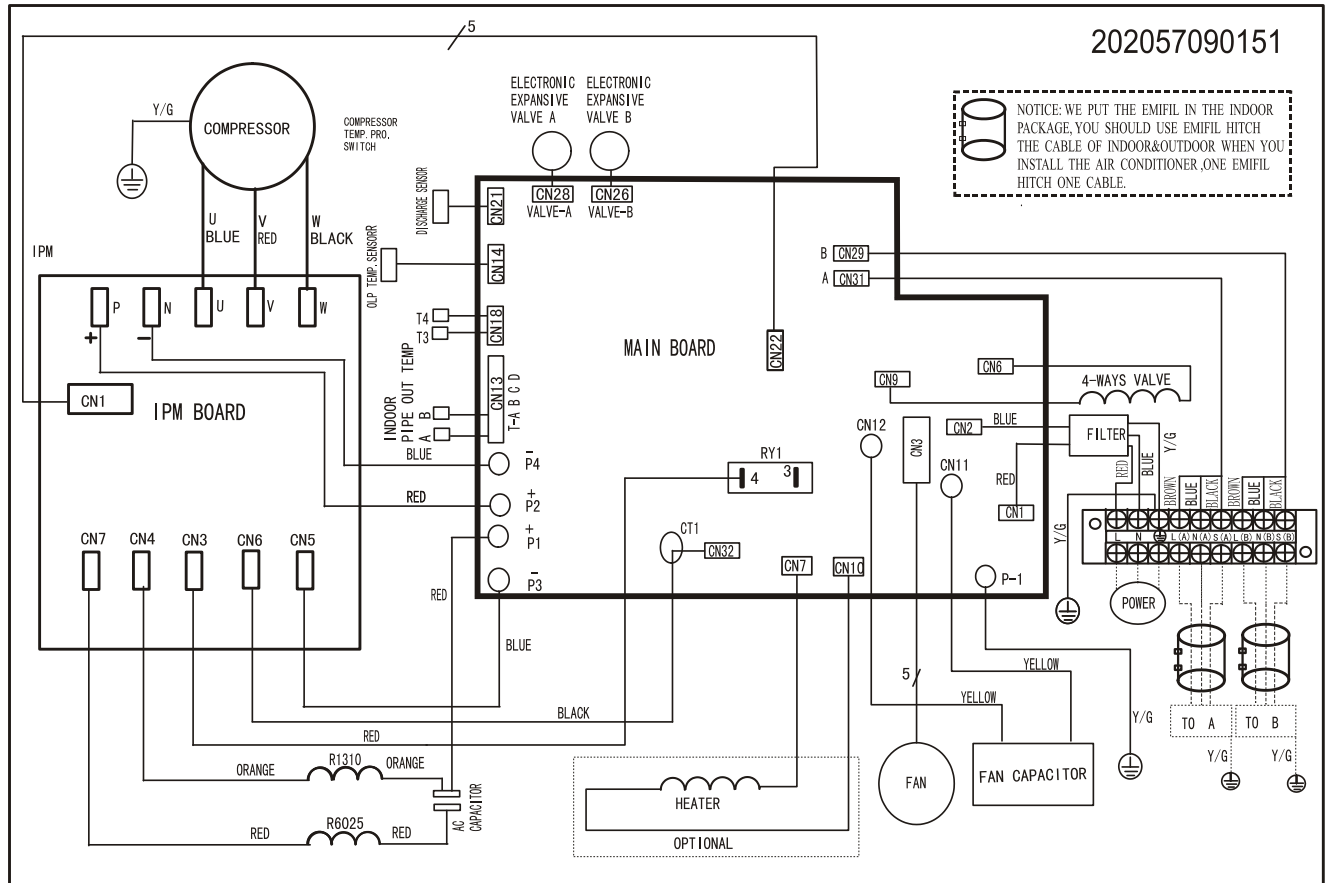
3. Dimensions



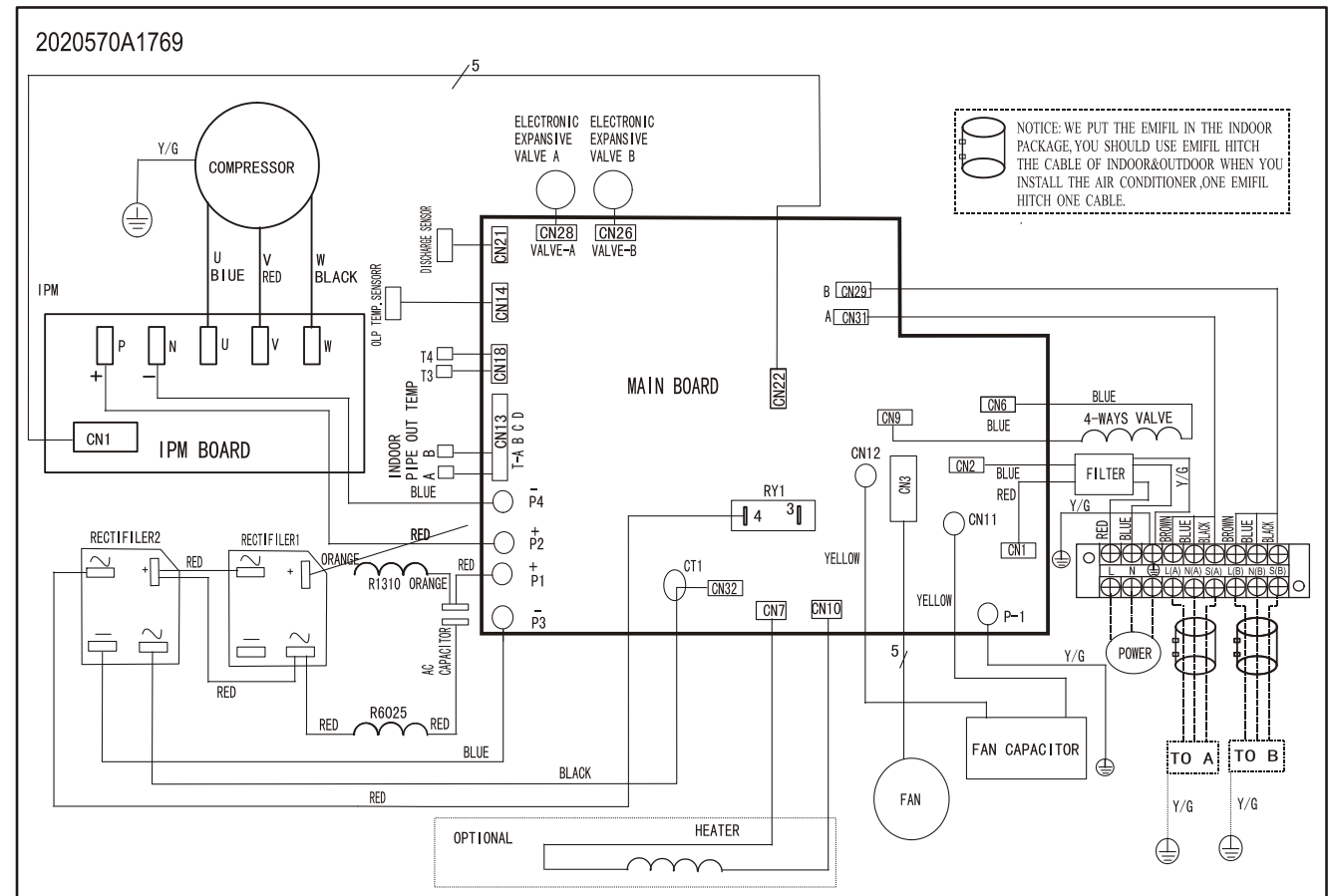
| MODEL | W | D | H | W1 | A | B |
|----------------------------------|-----|-----|-----|------|-----|-----|
| M2OC-14HRDN1-Q M2OC-14HRDN1 | 760 | 285 | 590 | 823 | 530 | 290 |
| M2OC-18HRDN1 | 845 | 320 | 700 | 908 | 560 | 335 |
| M2OC1-18HRDN1-Q | 845 | 320 | 700 | 908 | 560 | 335 |
| M3OC1-21HRDN1-Q | 845 | 320 | 700 | 908 | 560 | 335 |
| M3OC-27HRDN1 | 845 | 320 | 700 | 908 | 560 | 335 |
| M3OC1-27HRDN1-Q | 845 | 320 | 700 | 908 | 560 | 335 |
| M4OC-24HRDN1-Q | 845 | 320 | 700 | 908 | 560 | 335 |
| M4OC-27HRDN1 M4OC1-27HRDN1-Q | 900 | 315 | 860 | 980 | 590 | 333 |
| M4OC-36HRDN1-Q M5OA-36HRDN1-Q | 990 | 345 | 965 | 1075 | 624 | 366 |

4. Wiring Diagram

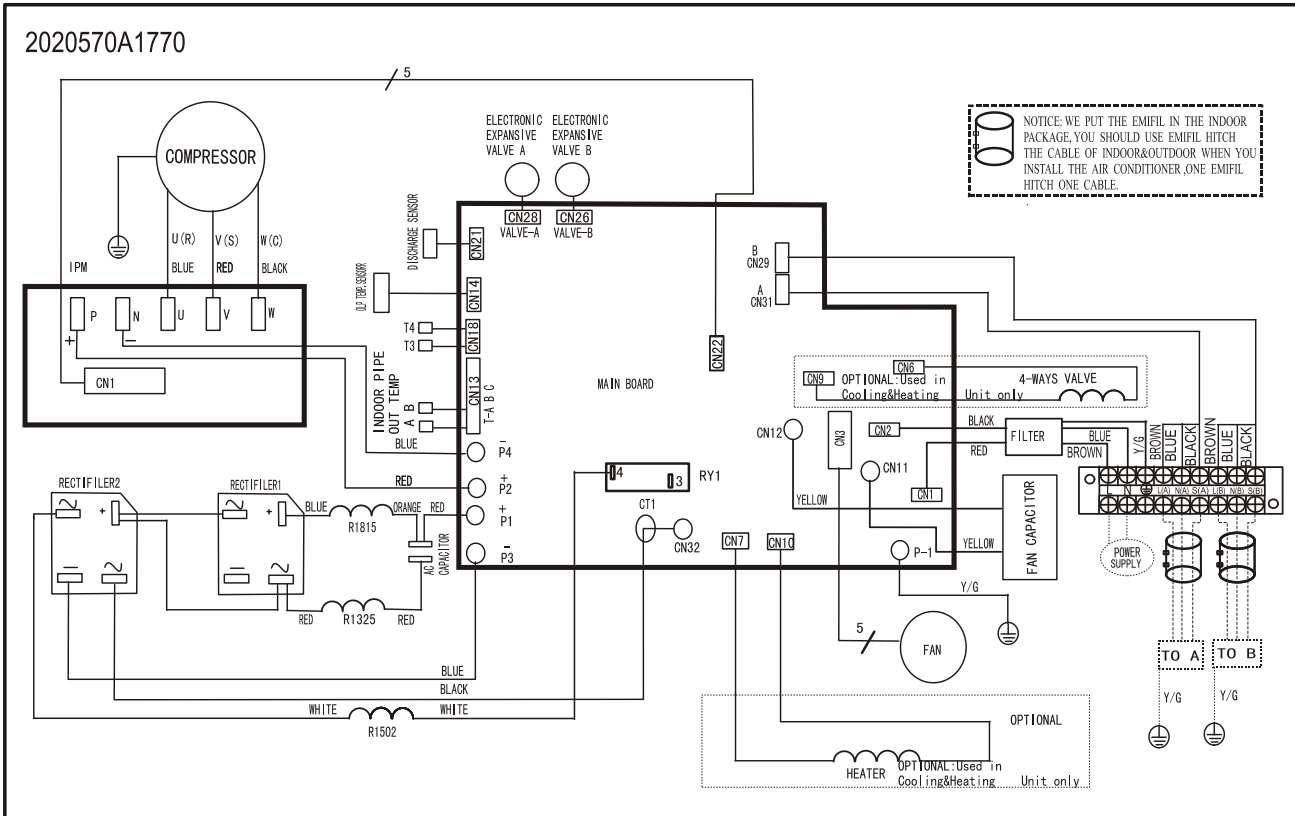
4.1 M2OC-14HRDN1-Q



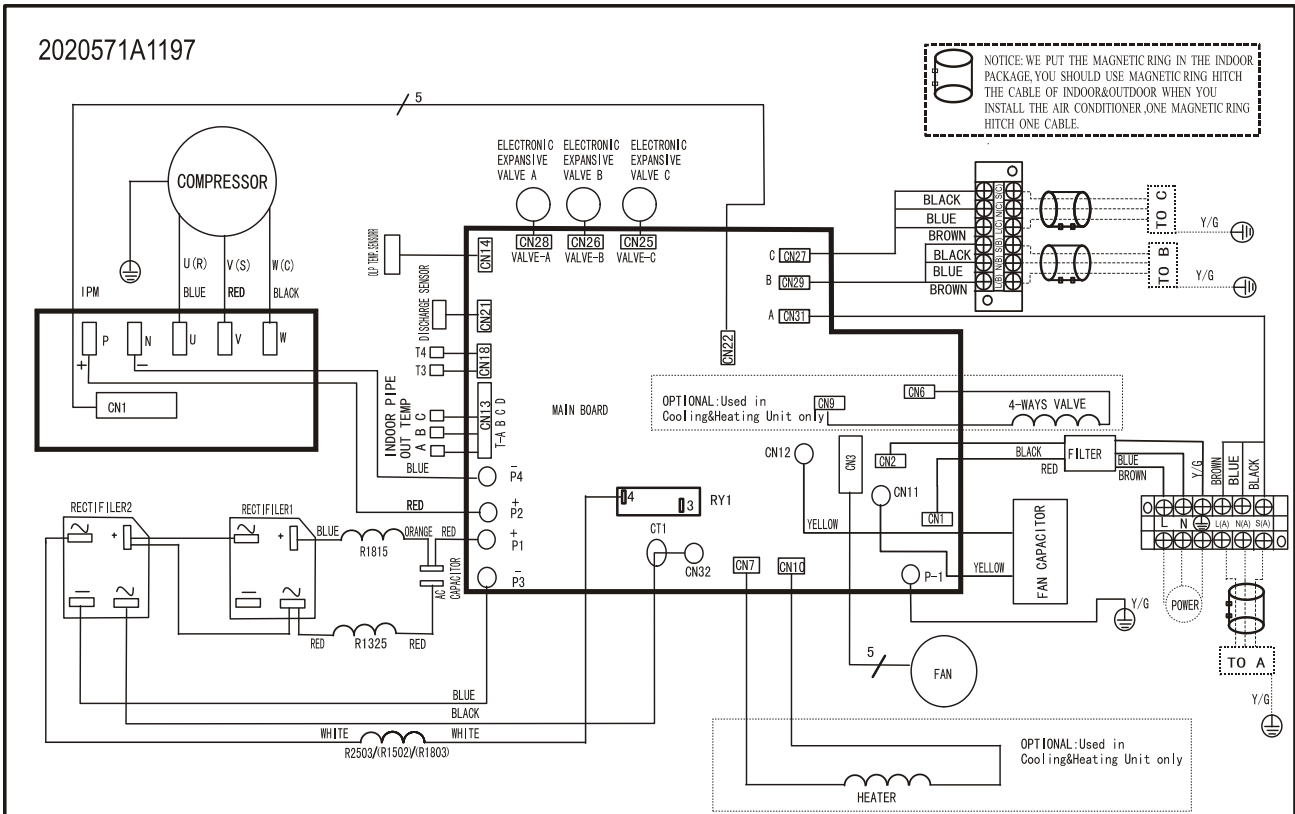
4.2 M2OC-14HRDN1



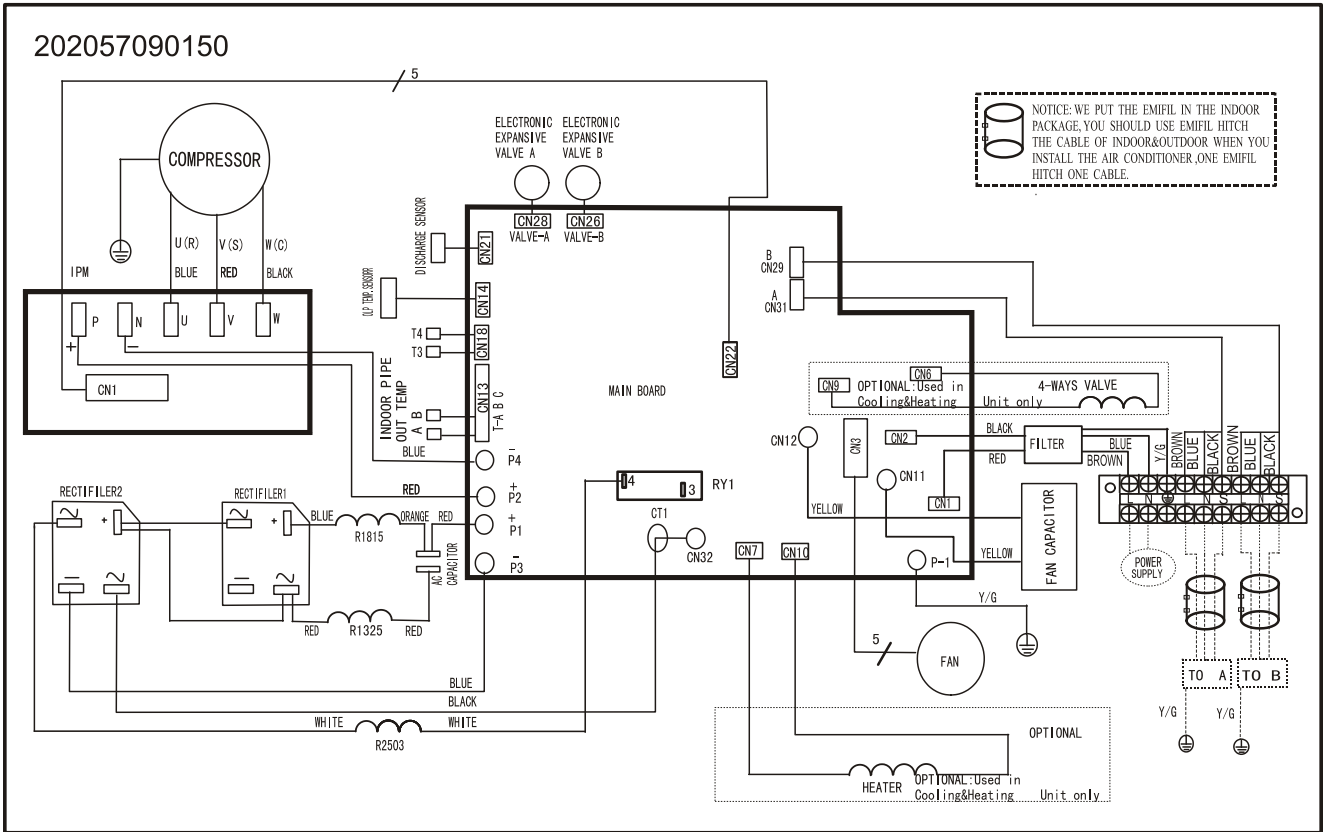
4.3 M2OC1-18HRDN1-Q



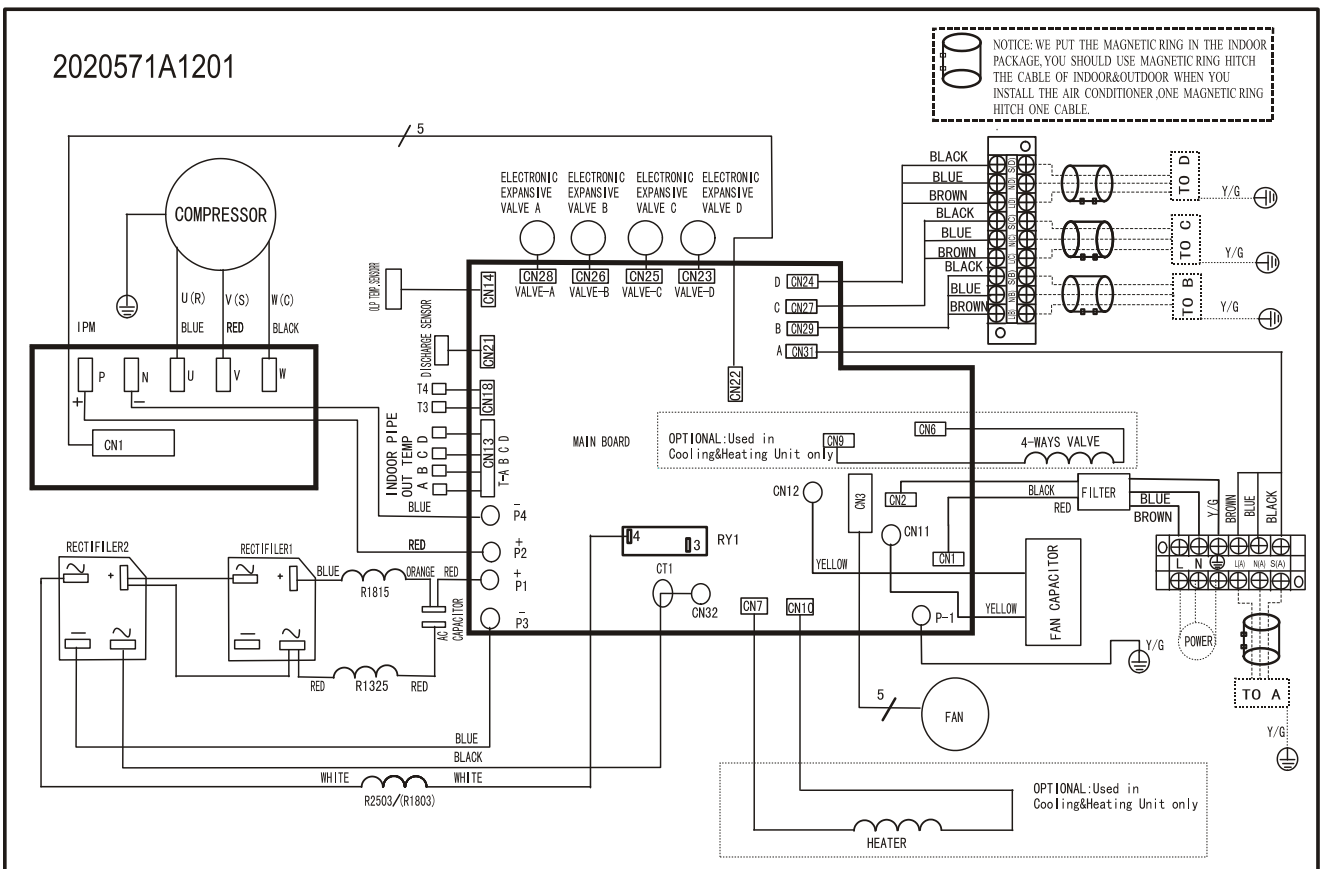
4.4 M3OC1-21HRDN1-Q M3OC1-27HRDN1-Q M3OC-27HRDN1



4.5 M2OC-18HRDN1



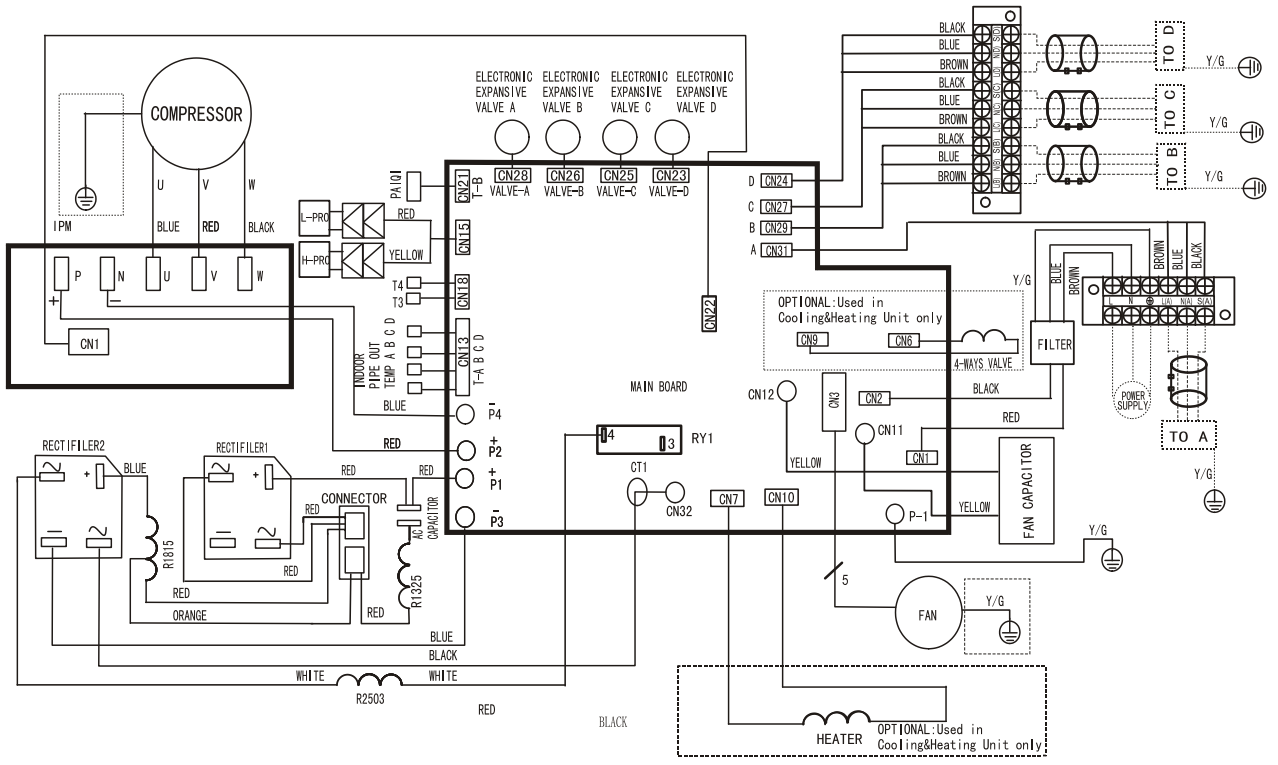
4.6 M4OC-24HRDN1-Q



4.7 M4OC1-27HRDN1-Q, M4OC-27HRDN1

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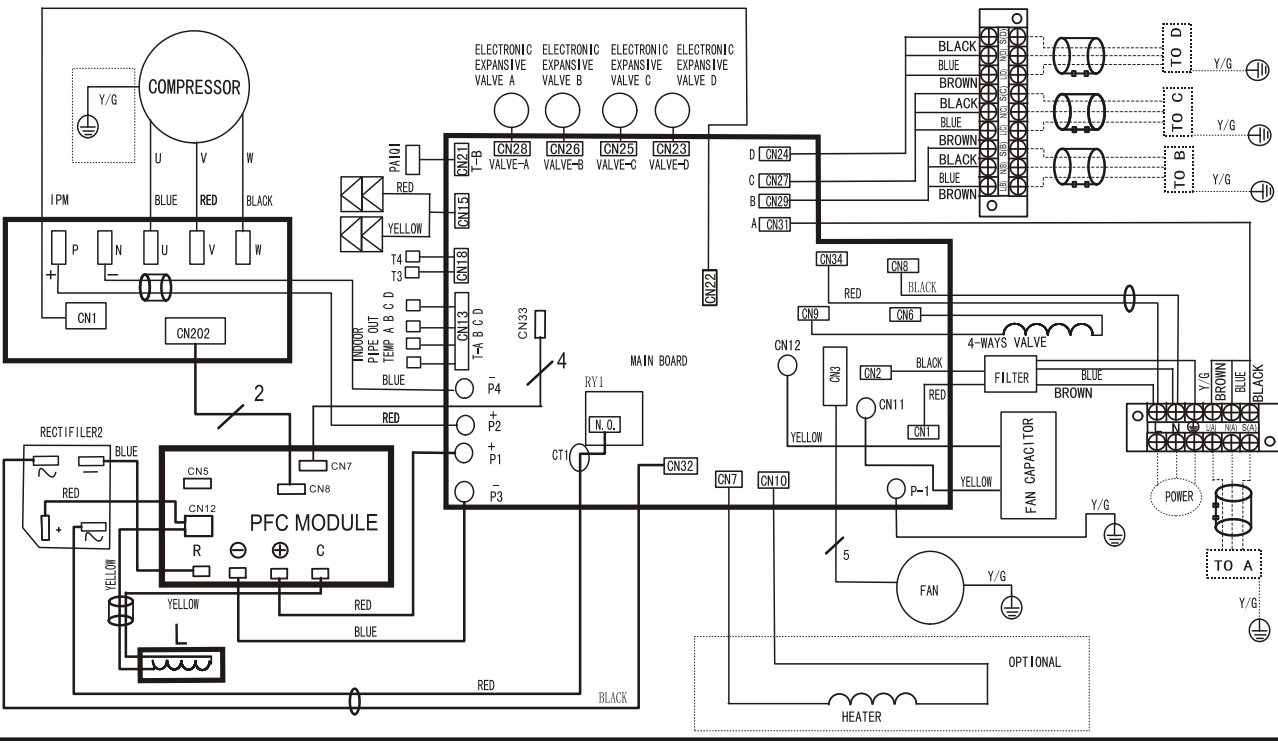
NOTICE: WE PUT THE EMIFIL IN THE INDOOR PACKAGE, YOU SHOULD USE EMIFIL HITCH THE CABLE OF INDOOR&OUTDOOR WHEN YOU INSTALL THE AIR CONDITIONER, ONE EMIFIL HITCH ONE CABLE.



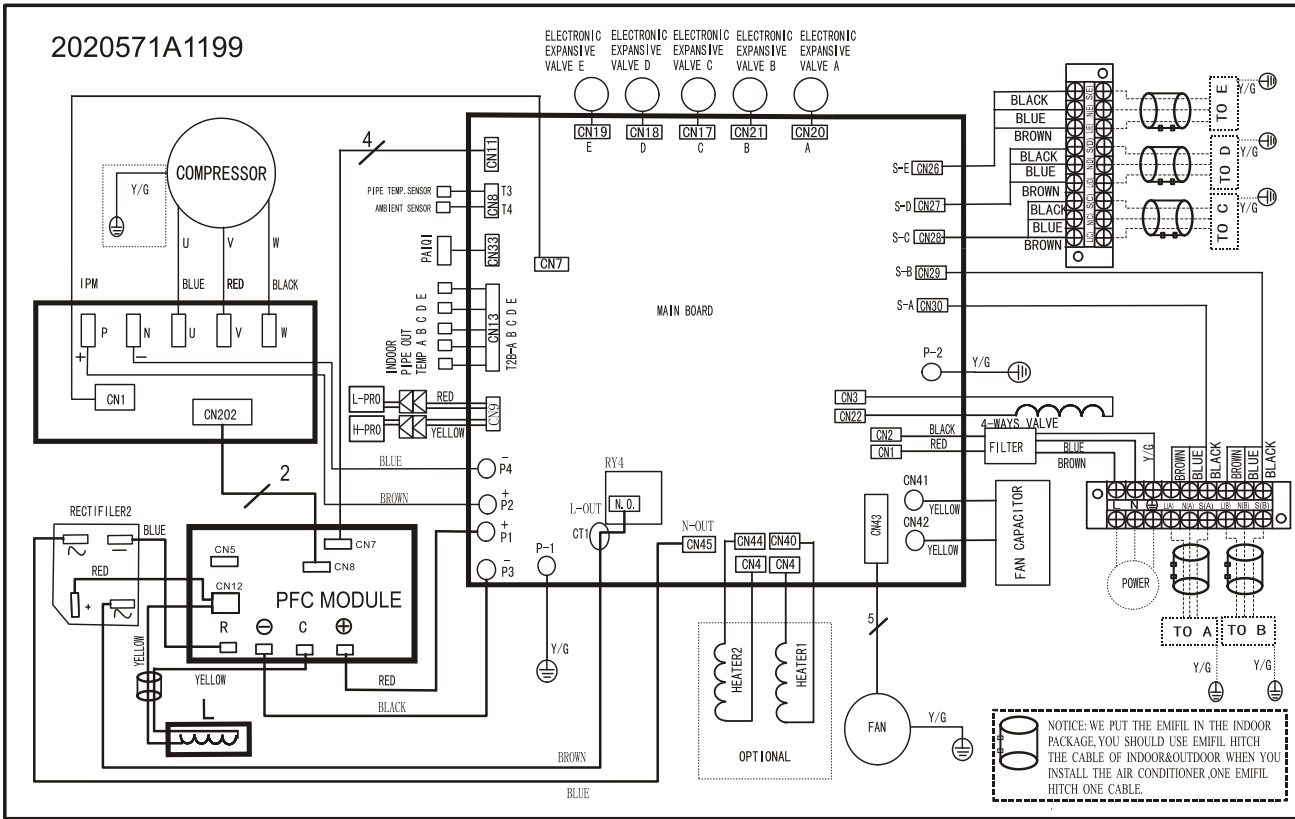
4.8 M4OC-36HRDN1-Q

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NOTICE: WE PUT THE EMIFIL IN THE INDOOR PACKAGE, YOU SHOULD USE EMIFIL HITCH THE CABLE OF INDOOR&OUTDOOR WHEN YOU INSTALL THE AIR CONDITIONER, ONE EMIFIL HITCH ONE CABLE.

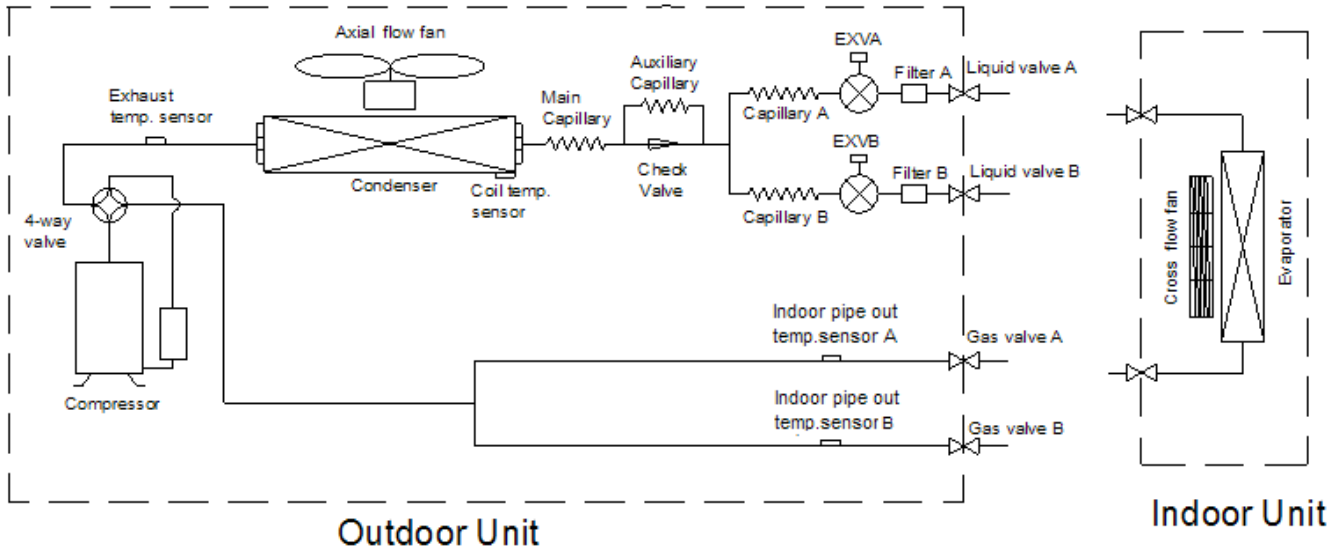


4.9 M50A-36HRDN1-Q

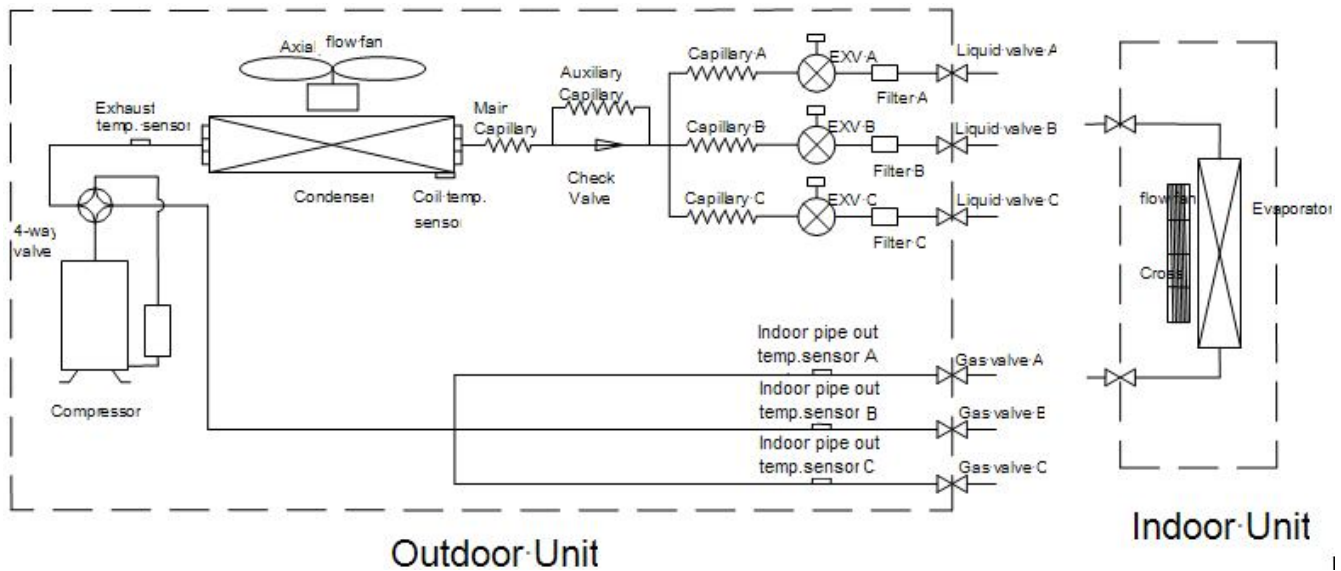


5. Refrigeration Cycle Diagram

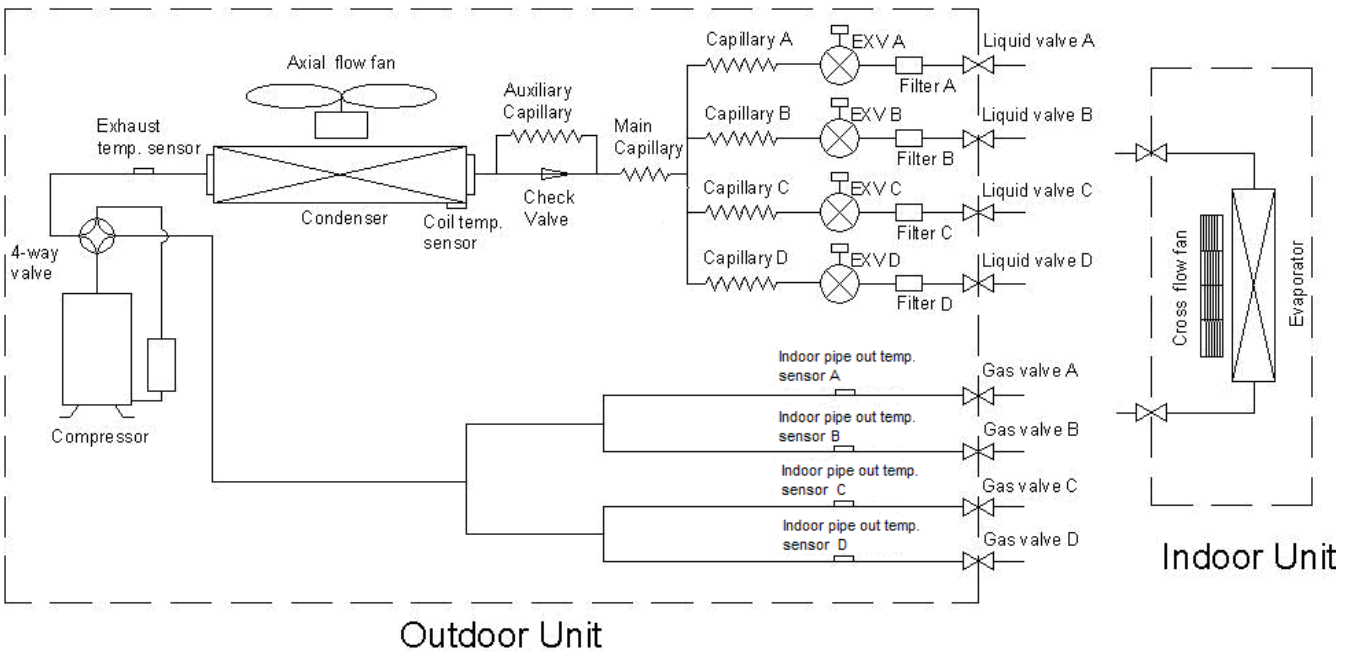
5.1 Refrigeration circuit drawing of inverter binary type



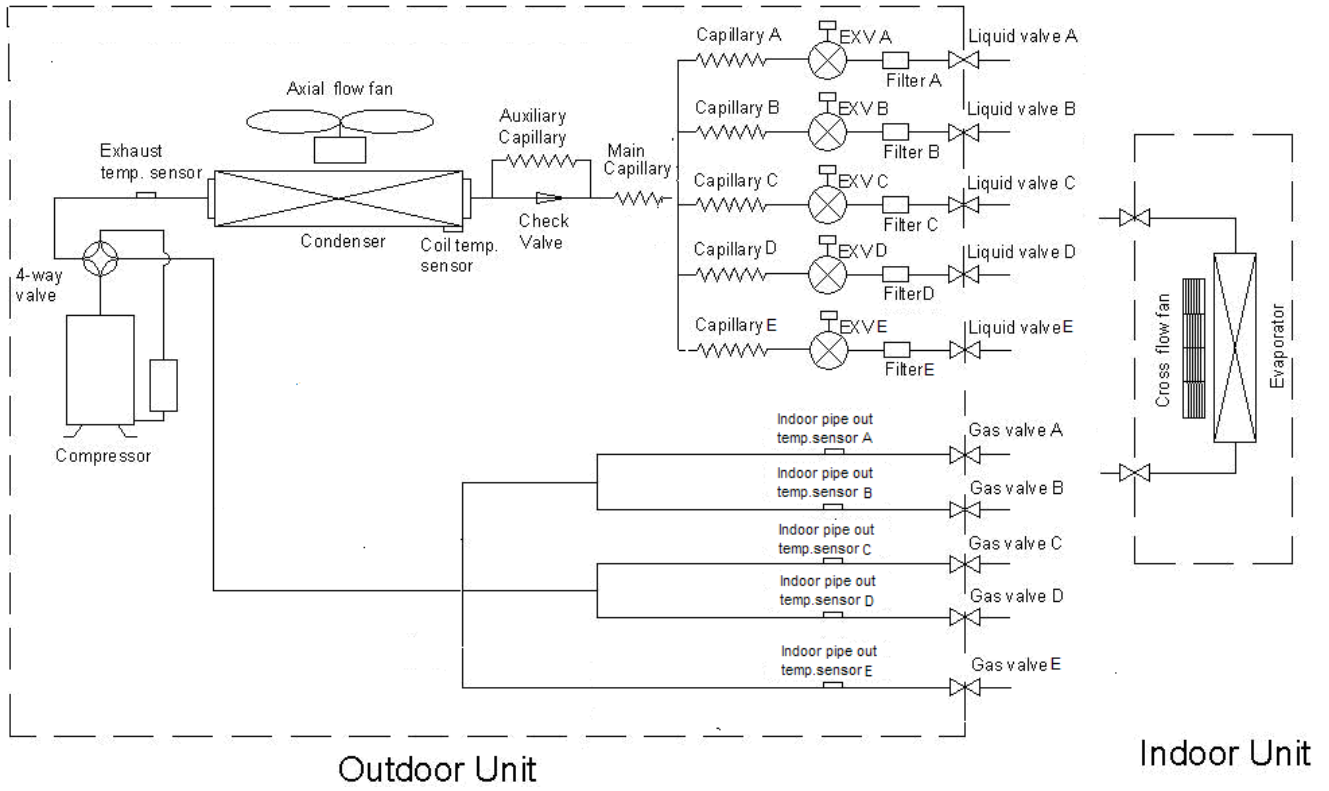
4.2 Refrigeration circuit drawing of inverter trinary type



5.3 Refrigeration circuit drawing of inverter quadplex type



5.4 Refrigeration circuit drawing of inverter quintuple type



6. Indoor units combination

6.1 Indoor unit combination for M2OC-14HRDN1-Q、M2OC-14HRDN1

| One unit | Two unit | |
|----------|----------|------|
| 7 | 7+7 | 9+9 |
| 9 | 7+9 | 9+12 |
| 12 | 7+12 | |

Note: There should be no more than one cassette or duct or console or ceiling & floor unit.

6.2 Indoor unit combination for M2OC1-18HRDN1-Q、M2OC-18HRDN1

| One unit | Two unit | |
|----------|----------|-------|
| 7 | 7+7 | 9+9 |
| 9 | 7+9 | 9+12 |
| 12 | 7+12 | 12+12 |
| 18 | 7+18 | |

Note: The 18k indoor unit should only be wall mounted unit.

6.3 Indoor unit combination for M3OC1-21HRDN1-Q

| One unit | Two unit | | Three unit | |
|----------|----------|-------|------------|--------|
| 7 | 7+7 | 9+9 | 7+7+7 | 7+9+12 |
| 9 | 7+9 | 9+12 | 7+7+9 | 9+9+9 |
| 12 | 7+12 | 9+18 | 7+7+12 | 9+9+12 |
| 18 | 7+18 | 12+12 | 7+9+9 | |

Note: There should be no more than one cassette or duct or console or ceiling & floor unit. And the 18k indoor unit should only be wall mounted unit.

6.4 Indoor unit combination for M3OC1-27HRDN1-Q、M3OC-27HRDN1

| One unit | Two unit | | | Three unit | | |
|----------|----------|------|-------|------------|---------|---------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+9+9 | 9+9+9 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+9+12 | 9+9+12 |
| 12 | 7+12 | 9+18 | | 7+7+12 | 7+12+12 | 9+12+12 |
| 18 | 7+18 | | | 7+7+18 | | |

Note: The 18k indoor unit should only be wall mounted unit.

6.5 Indoor unit combination for M4OC-24HRDN1-Q

| One unit | Two unit | | | Three unit | | | Four unit | | |
|----------|----------|------|-------|------------|---------|---------|-----------|----------|----------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+9+9 | 9+9+9 | 7+7+7+7 | 7+7+9+9 | 9+9+9+9 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+9+12 | 9+9+12 | 7+7+7+9 | 7+7+9+12 | 9+9+9+12 |
| 12 | 7+12 | 9+18 | | 7+7+12 | 7+12+12 | 9+12+12 | 7+7+7+12 | 7+9+9+9 | |
| 18 | 7+18 | | | 7+7+18 | | | | 7+9+9+12 | |

Note: The 18k indoor unit should only be wall mounted unit.

6.6 Indoor unit combination for M4OC1-27HRDN1-Q、M4OC-27HRDN1

| One unit | Two unit | | | Three unit | | | Four unit | | |
|----------|----------|------|-------|------------|----------|---------|-----------|-----------|-----------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+9+12 | 9+9+9 | 7+7+7+7 | 7+7+9+9 | 7+9+9+12 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+9+18 | 9+9+12 | 7+7+7+9 | 7+7+9+12 | 7+9+12+12 |
| 12 | 7+12 | 9+18 | 18+18 | 7+7+12 | 7+12+12 | 9+9+18 | 7+7+7+12 | 7+7+12+12 | 9+9+9+9 |
| 18 | 7+18 | | | 7+7+18 | 7+12+18 | 9+12+12 | 7+7+7+18 | 7+9+9+9 | 9+9+9+12 |
| | | | | 7+9+9 | 12+12+12 | 9+12+18 | | | |

6.7 Indoor unit combination for M4OC-36HRDN1-Q

| One unit | Two unit | | | Three unit | | | Four unit | | | |
|----------|----------|------|-------|------------|---------|----------|-----------|-----------|------------|-------------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+12+12 | 9+12+18 | 7+7+7+7 | 7+7+12+12 | 7+9+12+18 | 9+9+12+12 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+12+18 | 9+18+18 | 7+7+7+9 | 7+7+12+18 | 7+9+18+18 | 9+9+12+18 |
| 12 | 7+12 | 9+18 | 18+18 | 7+7+12 | 7+18+18 | 12+12+12 | 7+7+7+12 | 7+7+18+18 | 7+12+12+12 | 9+12+12+12 |
| 18 | 7+18 | | | 7+7+18 | 9+9+9 | 12+12+18 | 7+7+7+18 | 7+9+9+9 | 7+12+12+18 | 9+12+12+18 |
| | | | | 7+9+9 | 9+9+12 | 12+18+18 | 7+7+9+9 | 7+9+9+12 | 9+9+9+9 | 12+12+12+12 |
| | | | | 7+9+12 | 9+9+18 | | 7+7+9+12 | 7+9+9+18 | 9+9+9+12 | 12+12+12+18 |
| | | | | 7+9+18 | 9+12+12 | | 7+7+9+18 | 7+9+12+12 | 9+9+9+18 | |

6.8 Indoor unit combination for M5OA-36HRDN1-Q

| One Unit | Two Unit | | Three Unit | | | |
|------------|-------------|--------------|--------------|----------------|----------|----------|
| 7 | 7+7 | 9+12 | 7+7+7 | 7+9+18 | 9+9+18 | 12+18+18 |
| 9 | 7+9 | 9+18 | 7+7+9 | 7+12+12 | 9+12+12 | 18+18+18 |
| 12 | 7+12 | 12+12 | 7+7+12 | 7+12+18 | 9+12+18 | |
| 18 | 7+18 | 12+18 | 7+7+18 | 7+18+18 | 9+18+18 | |
| | 9+9 | 18+18 | 7+9+9 | 9+9+9 | 12+12+12 | |
| | | | 7+9+12 | 9+9+12 | 12+12+18 | |
| Four Unit | | | | | | |
| 7+7+7+7 | 7+7+9+18 | 7+9+9+18 | 7+12+18+18 | 9+9+18+18 | | |
| 7+7+7+9 | 7+7+12+12 | 7+9+12+12 | 9+9+9+9 | 9+12+12+12 | | |
| 7+7+7+12 | 7+7+12+18 | 7+9+12+18 | 9+9+9+12 | 9+12+12+18 | | |
| 7+7+7+18 | 7+7+18+18 | 7+9+18+18 | 9+9+9+18 | 12+12+12+12 | | |
| 7+7+9+9 | 7+9+9+9 | 7+12+12+12 | 9+9+12+12 | 12+12+12+18 | | |
| 7+7+9+12 | 7+9+9+12 | 7+12+12+18 | 9+9+12+18 | | | |
| Five Unit | | | | | | |
| 7+7+7+7+7 | 7+7+7+9+18 | 7+7+9+12+18 | 7+9+9+12+18 | 9+9+9+12+12 | | |
| 7+7+7+7+9 | 7+7+7+12+18 | 7+7+12+12+18 | 7+9+12+12+12 | 9+9+9+12+18 | | |
| 7+7+7+7+12 | 7+7+7+18+18 | 7+9+9+9+9 | 7+9+12+12+18 | 9+9+12+12+12 | | |
| 7+7+7+7+18 | 7+7+9+9+9 | 7+9+9+9+12 | 9+9+9+9+9 | 9+12+12+12+12 | | |
| 7+7+7+9+9 | 7+7+9+9+12 | 7+9+9+9+18 | 9+9+9+9+12 | 12+12+12+12+12 | | |
| 7+7+7+9+12 | 7+7+9+9+18 | 7+9+9+12+12 | 9+9+9+9+18 | | | |

7. Electronic control function

7.1 Abbreviation

- T1: Indoor ambient temperature
- T2: Coil temperature of indoor heat exchanger middle.
- T2B: Coil temperature of indoor heat exchanger outlet.
- T3: Coil temperature of outdoor heat exchanger
- T4: Outdoor ambient temperature
- T5: Compressor discharge temperature
- Ts: Setting temp.

7.2 Electric Control working environment.

- 7.2.1 Input voltage: 190~264V.
- 7.2.2 Input power frequency:50Hz.
- 7.2.3 Indoor fan normal working amp. is less than 1A.
- 7.2.4 Outdoor fan. Normal working amp. is less than 1.5A.
- 7.2.5 Four-way valve normal working amp. is less than 1A.
- 7.2.6 Swing motor: DC12V.

7.3 Outdoor unit's digital display tube

There is a digital display tube in outdoor PCB.

Digital display tube display function

- In standby , the LED displays “- -”
- In compressor operation, the LED display the running frequency,
- In defrosting mode, The LED displays “dF” or alternative displays between running frequency and “dF”(each displays 2s)
- In compressor pre-heating, The LED displays “- -”
- In protection or malfunction, the LED displays error code or protection code.

7.4 Outdoor unit point check function

There is a check switch in outdoor PCB.

Push the switch SW1 to check the states of unit when the unit is running. The digital display tube will display the follow procedure when push SW1 each time.

For units except M5OA-36HRDN1-Q model:

| | Display | Remark |
|----|--|----------------------------------|
| 1 | Indoor unit capacity demand code | |
| 2 | Outdoor unit running mode code | Off:0, Cooling:1, Heating:2 |
| 3 | Amendatory capacity demand code | |
| 4 | Outdoor unit fan motor state | Off:0, Low speed:1, High speed:2 |
| 5 | Evaporator outlet temp. for 1# indoor unit | Actual data |
| 6 | Evaporator outlet temp. for 2# indoor unit | Actual data |
| 7 | Evaporator outlet temp. for 3# indoor unit | Actual data |
| 8 | Evaporator outlet temp. for 4# indoor unit | Actual data |
| 9 | Condenser pipe temp. | Actual data |
| 10 | Ambient temp. | Actual data |
| 11 | Compressor discharge temp. | Actual data |
| 12 | Inverter current | Actual data |

| | | |
|----|--|---|
| 13 | EXV open angle for 1# indoor unit | Actual data/8 |
| 14 | EXV open angle for 2# indoor unit | Actual data/8 |
| 15 | EXV open angle for 3# indoor unit | Actual data/8 |
| 16 | EXV open angle for 4# indoor unit | Actual data/8 |
| 17 | Power supply of outdoor unit | AD data |
| 18 | Indoor unit number | The indoor unit can communicate with outdoor unit well. |
| 19 | The last error or protection code | 00 means no malfunction |
| 20 | frequency value | Actual data |
| 21 | Ambient temp. of 1# indoor unit | Actual data |
| 22 | Condenser pipe temp. of 1# indoor unit | Actual data |
| 23 | Ambient temp. of 2# indoor unit | Actual data |
| 24 | Condenser pipe temp. of 2# indoor unit | Actual data |
| 25 | Ambient temp. of 3# indoor unit | Actual data |
| 26 | Condenser pipe temp. of 3# indoor unit | Actual data |
| 27 | Ambient temp. of 4# indoor unit | Actual data |
| 28 | Condenser pipe temp. of 4# indoor unit | Actual data |
| 29 | --- | Check point over |

For M50A-36HRDN1-Q model:

| | Display | Remark |
|----|--|---|
| 1 | No. of indoor units in good connection | Actual data |
| 2 | Outdoor unit running mode code | Off:0, Cooling:2, Heating:3, Forced cooling:4 |
| 3 | A indoor unit capacity | The capacity unit is horse power. If the indoor unit is not connected, the digital display tube will show: " -- " |
| 4 | B indoor unit capacity | |
| 5 | C indoor unit capacity | |
| 6 | D indoor unit capacity | |
| 7 | E indoor unit capacity | |
| 8 | A Indoor unit capacity demand code | |
| 9 | B Indoor unit capacity demand code | |
| 10 | C Indoor unit capacity demand code | |
| 11 | D Indoor unit capacity demand code | |
| 12 | E Indoor unit capacity demand code | |
| 13 | Total indoor units amendatory capacity demand code | |
| 14 | The frequency corresponding to the total indoor units amendatory capacity demand | |
| 15 | The frequency after the frequency limit | |
| 16 | The frequency sending to compressor control chip | |
| 17 | A indoor unit evaporator outlet temp.(T _{2B} A) | If the temp. is lower than -9 degree, the digital display tube will show "-9".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: " -- " |
| 18 | B indoor unit evaporator outlet temp.(T _{2B} B) | |
| 19 | C indoor unit evaporator outlet temp.(T _{2B} C) | |
| 20 | D indoor unit evaporator outlet temp.(T _{2B} D) | |
| 21 | E indoor unit evaporator outlet temp.(T _{2B} E) | |
| 22 | A indoor unit room temp.(T ₁ A) | |
| 23 | B indoor unit room temp.(T ₁ B) | |
| 24 | C indoor unit room temp.(T ₁ C) | |
| 25 | D indoor unit room temp.(T ₁ D) | |
| 26 | E indoor unit room temp.(T ₁ E) | |

| | | | | |
|------|--|---|-----------------------------------|---|
| 27 | A indoor unit evaporator outlet temp.(T _{2B} A) | If the temp. is lower than -9 degree, the digital display tube will show "-9".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "--" | | |
| 28 | B indoor unit evaporator outlet temp.(T _{2B} B) | | | |
| 29 | C indoor unit evaporator outlet temp.(T _{2B} C) | | | |
| 30 | D indoor unit evaporator outlet temp.(T _{2B} D) | | | |
| 31 | E indoor unit evaporator outlet temp.(T _{2B} E) | | | |
| 32 | Condenser pipe temp.(T3) | | | |
| 33 | Outdoor ambient temp.(T4) | | | |
| 34 | Compressor discharge temp.(Tp) | The display value is between 30~120 degree. If the temp. is lower than 30 degree, the digital display tube will show "30".If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. For example, the digital display tube show "0.5",it means the compressor discharge temp. is 105 degree.) | | |
| 35 | AD value of current | The display value is hex number. | | |
| 36 | AD value of voltage | | | |
| 37 | EXV open angle for A indoor unit | Actual data/4. If the value is higher than 99, the digital display tube will show single digit and tens digit. For example ,the digital display tube show "2.0",it means the EXV open angle is 120×4=480p.) | | |
| 38 | EXV open angle for B indoor unit | | | |
| 39 | EXV open angle for C indoor unit | | | |
| 40 | EXV open angle for D indoor unit | | | |
| 41 | EXV open angle for E indoor unit | | | |
| 42 | Frequency limit symbol | Bit7 | 0 | The display value is hex number. For example, the digital display tube show 2A,then Bit5=1, Bit3=1, Bit1=1. It means frequency limit caused by T4,T3 and current. |
| | | Bit6 | 0 | |
| | | Bit5 | Frequency limit caused by T4. | |
| | | Bit4 | Frequency limit caused by T2. | |
| | | Bit3 | Frequency limit caused by T3. | |
| | | Bit2 | Frequency limit caused by Tp. | |
| | | Bit1 | Frequency limit caused by current | |
| Bit0 | Frequency limit caused by voltage | | | |
| 43 | Average value of T2 | (Sum T2 value of all indoor units)/(indoor units number) | | |
| 44 | Outdoor unit fan motor state | Off:0, High speed:1, Med speed:2, Low speed:3 | | |
| 45 | The last error or protection code | 00 means no malfunction | | |

7.4.1 Frequency of compressor:

| Display | Frequency of compressor (Hz) |
|---------|------------------------------|
| 30 | 30 |
| -- | Stand by |
| 60 | 60 |

7.4.2 Running mode:

| Display | Corresponding mode |
|---------|--------------------|
| 0 | Off |
| 1 | Cooling mode |
| 2 | Heating mode |

7.4.3 Capacity demand:

Cooling mode

| | | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| Capacity | 2000-2500 | 2000-2500 | 3000-3800 | 4500-5000 | 5000-5500 | 5500-6100 | 6100-7000 | 7000-7500 | 7500-8000 | >7500 |
| Corresponding Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | >=10 |

Heating mode

| | | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| Capacity | 2000-2500 | 2000-2500 | 3000-3800 | 4500-5000 | 5500-6100 | 6100-7000 | 6100-7000 | 7000-7500 | 7500-8000 | >8000 |
| Corresponding Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9-10 | >=11 |

Note:

The capacity is just for reference.

7.4.4 Number of indoor unit

| Display | Number of indoor unit |
|---------|-----------------------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |

7.4.5 Outdoor ambient temp:

| Display | Corresponding temp. | Display | Corresponding temp. | Display | Corresponding temp. |
|---------|---------------------|---------|---------------------|---------|---------------------|
| 15 | -7.5 | 50 | 10 | 80 | 25 |
| 16 | -7 | 51 | 10.5 | 81 | 25.5 |
| 17 | -6.5 | 52 | 11 | 82 | 26 |
| 18 | -6 | 53 | 11.5 | 83 | 26.5 |
| 19 | -5.5 | 53 | 11.5 | 84 | 27 |
| 20 | -5 | 54 | 12 | 85 | 27.5 |
| 21 | -4.5 | 55 | 12.5 | 86 | 28 |
| 22 | -4 | 56 | 13 | 87 | 28.5 |
| 23 | -3.5 | 57 | 13.5 | 88 | 29 |
| 24 | -3 | 58 | 14 | 89 | 29.5 |
| 26 | -2 | 59 | 14.5 | 90 | 30 |
| 27 | -1.5 | 60 | 15 | 91 | 30.5 |
| 28 | -1 | 61 | 15.5 | 92 | 31 |
| 29 | -0.5 | 62 | 16 | 93 | 31.5 |
| 30 | 0 | 63 | 16.5 | 93 | 31.5 |
| 31 | 0.5 | 63 | 16.5 | 94 | 32 |
| 32 | 1 | 64 | 17 | 95 | 32.5 |
| 33 | 1.5 | 65 | 17.5 | 96 | 33 |
| 34 | 2 | 65 | 17.5 | 97 | 33.5 |
| 35 | 2.5 | 66 | 18 | 98 | 34 |
| 36 | 3 | 67 | 18.5 | 99 | 34.5 |
| 37 | 3.5 | 68 | 19 | 10. | 35~40 |
| 38 | 4 | 69 | 19.5 | 11. | 40~45 |
| 39 | 4.5 | 70 | 20 | 12. | 45~50 |
| 40 | 5 | 71 | 20.5 | 13. | 50~55 |
| 41 | 5.5 | 72 | 21 | 14. | 55~60 |
| 42 | 6 | 73 | 21.5 | 15. | 60~65 |
| 43 | 6.5 | 74 | 22 | 16. | 65~70 |
| 44 | 7 | 75 | 22.5 | | |
| 45 | 7.5 | 75 | 22.5 | | |
| 46 | 8 | 76 | 23 | | |
| 47 | 8.5 | 77 | 23.5 | | |
| 48 | 9 | 78 | 24 | | |
| 49 | 9.5 | 79 | 24.5 | | |

7.4.6 Opening degree of electronic expansion valve:

Opening degree equals the display data times 8

7.5 Protection

7.5.1 Three minutes delay at restart for compressor.

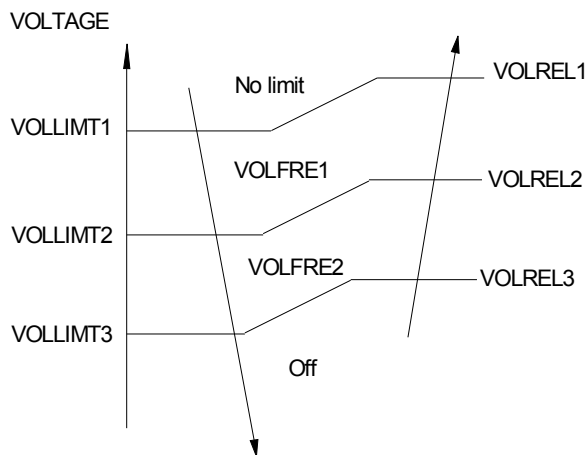
7.5.2 Temperature protection of compressor discharge.

When the compressor discharge temp. is getting higher, the running frequency will be limited as below rules:

---If $102^{\circ}\text{C} < T5 < 115^{\circ}\text{C}$, decrease the frequency to the lower level every 2 minutes till to F1.

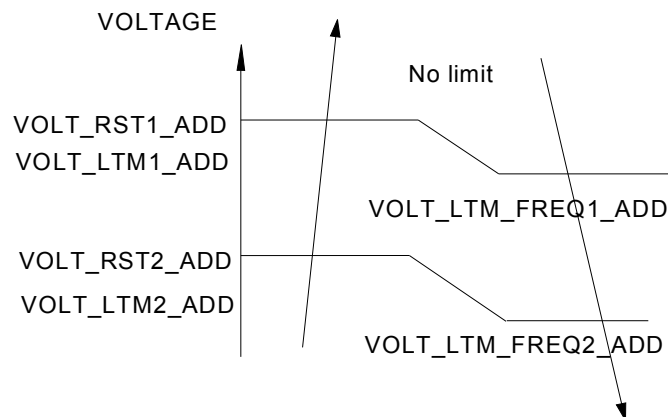
---If $T5 > 115^{\circ}\text{C}$ for 10 seconds, the compressor will stop and restart till $T5 < 90^{\circ}\text{C}$.

7.5.3 Under voltage protection



| Mode | VOLLIMIT1(V) | VOLLIMIT2(V) | VOLLIMIT3(V) | VOLREL1(V) | VOLREL2(V) | VOLREL3(V) | VOLFRE1(Hz) | VOLFRE2(Hz) |
|-----------------|--------------|--------------|--------------|------------|------------|------------|-------------|-------------|
| M2OC-14HRDN1 | 220 | 200 | 80 | 250 | 210 | 100 | 62 | 54 |
| M2OC-14HRDN1-Q | 220 | 200 | 80 | 250 | 210 | 100 | 62 | 54 |
| M2OC-18HRDN1 | 230 | 200 | 80 | 260 | 210 | 100 | 62 | 54 |
| M2OC1-18HRDN1-Q | 230 | 200 | 120 | 260 | 210 | 135 | 62 | 54 |
| M3OC1-21HRDN1-Q | 245 | 220 | 80 | 265 | 240 | 100 | 78 | 45 |
| M3OC-27HRDN1 | 245 | 220 | 80 | 265 | 240 | 100 | 78 | 45 |
| M3OC1-27HRDN1-Q | 245 | 220 | 120 | 265 | 240 | 135 | 78 | 45 |
| M4OC-24HRDN1-Q | 245 | 220 | 120 | 265 | 240 | 135 | 78 | 45 |
| M4OC-27HRDN1 | 221 | 210 | 80 | 260 | 225 | 100 | 62 | 54 |
| M4OC1-27HRDN1-Q | 221 | 210 | 80 | 260 | 225 | 100 | 53 | 44 |
| M4OC-36HRDN1-Q | 200 | 185 | 80 | 210 | 195 | 100 | 54 | 42 |

For M5OA-36HRDN1-Q,



VOLT_RST1_ADD=210V, VOLT_LIM1_ADD=200V, VOLT_RST2_ADD=195V, VOLT_LIM2_ADD=185V.
 VOLT_LIM_FREQ1_ADD=54Hz, VOLT_LIM_FREQ2_ADD=42Hz.

7.5.4 Compressor current limit protection

If the compressor current exceeds the current limit value for 10 seconds, the compressor frequency will be limited as below table.

For models except M50A-36HRDN1-Q.

Cooling mode:

| Current frequency(Hz) | Current limit value(A) | Frequency limit |
|--|------------------------|---|
| COOL_F10 | ICOOLLMT6 | Decrease the frequency to COOL_F4 and run at COOL_F4 for 3 minutes. After that, the frequency will be adjusted according to the capacity demand and rise to the upper level every 3 minutes (When the frequency>COOL_F4 via capacity demand). |
| COOL_F9 | ICOOLLMT5 | |
| COOL_F8 | ICOOLLMT4 | |
| COOL_F7 | ICOOLLMT3 | |
| COOL_F6 | ICOOLLMT2 | |
| COOL_F5 | ICOOLLMT1 | |
| If the current frequency is lower than COOL_F4, the frequency will not be limited. After 10s of the compressor start, if the current>ICOOL, the AC will display the failure for 30 seconds and stop. The AC will restart 3 minutes later. | | |

Heating mode:

| Current frequency(Hz) | Current limit value(A) | Frequency limit |
|--|------------------------|---|
| HEAT_F12 | IHEATLMT8 | Decrease the frequency to HEAT_F4 and run at HEAT_F4 for 3 minutes. After that, the frequency will be adjusted according to the capacity demand and rise to the upper level every 3 minutes (When the frequency>Heat_F4 via capacity demand). |
| HEAT_F11 | IHEATLMT7 | |
| HEAT_F10 | IHEATLMT6 | |
| HEAT_F9 | IHEATLMT5 | |
| HEAT_F8 | IHEATLMT4 | |
| HEAT_F7 | IHEATLMT3 | |
| HEAT_F6 | IHEATLMT2 | |
| HEAT_F5 | IHEATLMT1 | |
| If the current frequency is lower than HEAT_F4, the frequency will not be limited. After 10s of the compressor start, if the current>IHEAT, the AC will display the failure for 30 seconds and stop. The AC will restart 3 minutes later. | | |

For M50A-36HRDN1-Q model:

Cooling mode:

| Current frequency (Hz) | Current limit value (A) | Frequency limit |
|------------------------|-------------------------|---|
| COOL_F16 | ICOOLLMT12 | Decrease the frequency to COOL_F4 and run at COOL_F4 for 3 minutes. After that, the frequency will be adjusted according to the capacity demand and rise to the upper level every 3 minutes (When the frequency>COOL_F4 via capacity demand). |
| COOL_F15 | ICOOLLMT11 | |
| COOL_F14 | ICOOLLMT10 | |
| COOL_F13 | ICOOLLMT9 | |
| COOL_F12 | ICOOLLMT8 | |
| COOL_F11 | ICOOLLMT7 | |
| COOL_F10 | ICOOLLMT6 | |

| | | |
|--|-----------|--|
| COOL_F9 | ICOOLLMT5 | |
| COOL_F8 | ICOOLLMT4 | |
| COOL_F7 | ICOOLLMT3 | |
| COOL_F6 | ICOOLLMT2 | |
| COOL_F5 | ICOOLLMT1 | |
| <p>If the current frequency is lower than COOL_F4, the frequency will not be limited. After 10s of the compressor start, if the current>ICOOL, the AC will display the failure for 30 seconds and stop. The AC will restart 3 minutes later.</p> | | |

Heating mode:

| Current frequency (Hz) | Current limit value (A) | Frequency limit |
|--|-------------------------|--|
| HEAT_F16 | IHEATLMT12 | Decrease the frequency to HEAT_F4 and run at HEAT_F4 for 3 minutes. |
| HEAT_F15 | IHEATLMT11 | |
| HEAT_F14 | IHEATLMT10 | After that, the frequency will be adjusted according to the capacity demand and rise to the upper level every 3 minutes (When the frequency>Heat_F4 via capacity demand). |
| HEAT_F13 | IHEATLMT9 | |
| HEAT_F12 | IHEATLMT8 | |
| HEAT_F11 | IHEATLMT7 | |
| HEAT_F10 | IHEATLMT6 | |
| HEAT_F9 | IHEATLMT5 | |
| HEAT_F8 | IHEATLMT4 | |
| HEAT_F7 | IHEATLMT3 | |
| HEAT_F6 | IHEATLMT2 | |
| HEAT_F5 | IHEATLMT1 | |
| <p>If the current frequency is lower than HEAT_F4, the frequency will not be limited. After 10s of the compressor start, if the current>IHEAT, the AC will display the failure for 30 seconds and stop. The AC will restart 3 minutes later.</p> | | |

6.5.5 Indoor / outdoor units communication protection

If the indoor units can not receive the feedback signal from the outdoor units for 2 minutes, the AC will stop and display the failure.

7.5.6 High condenser coil temp. protection.

When T3>65°C for 3 seconds, the compressor will stop while the indoor fan and outdoor fan will continue.

When T3<52°C, the protection will release and the compressor will restart after 3 minutes.

7.5.7 Outdoor unit anti-freezing protection

When T2B<0°C for 250 seconds, the indoor unit capacity demand will be zero and resume to normal when T2B>10°C.

7.5.8 Oil return

Running rules:

1. If the compressor frequency keeps lower than RECOILINFRE for T_e minutes, the AC will rise the frequency to RECOILFRE for T_f seconds and then resume to former frequency. For M4OC-36HRDN1-Q, RECOILINFRE=45Hz, RECOILFRE=48Hz, $T_e=120$, $T_f=180$; For M5OA-36HRDN1-Q, RECOILINFRE=45Hz, RECOILFRE=48Hz, $T_e=90$, $T_f=100$; For other models, RECOILINFRE=50Hz, RECOILFRE=62Hz, $T_e=120$, $T_f=180$.

2. During the T_f seconds, the EXV and indoor units keep the current running mode(except M5OA-36HRDN1-Q model), the frequency will not be limited by the compressor discharge temp. and the current. For M5OA-36HRDN1-Q model, the EXV will keep 300p while the indoor units will keep the current running mode.

3. If the outdoor ambient is higher than 15°C during the oil return, the AC quit oil return.

7.5.9 Compressor preheating functions

---Preheating permitting condition:

If $T_4(\text{outdoor ambient temperature}) < 3^{\circ}\text{C}$ and the machine connects to power supply no longer than 5 seconds or if $T_4 < 3^{\circ}\text{C}$ and compressor has stopped for over 3 hours, the compressor heating cable will work.

---Preheating mode:

A weak current flow through the coil of compressor from the wiring terminal of compressor, then the compressor is heated without operation.

---Preheating release condition:

If $T_4 \geq 5^{\circ}\text{C}$ or the compressor starts running, preheating function will stop.

7.5.10 Compressor crankcase heater

When $T_4 < 3^{\circ}\text{C}$ and the compressor is not running, the crankcase heater will be active.

When $T_4 \geq 5^{\circ}\text{C}$ or the compressor starts up, the crankcase heater will stop work.(For M5OA-36HRDN1-Q, $T_4 \geq 8^{\circ}\text{C}$)

8. Troubleshooting

8.1 Indoor unit error code explanation:

Glory series

| NO. | MALFUNCTION | DEF | TIMER | AUTO | RUN |
|-----|--|-----|-------|------|-----|
| 1 | Indoor EEPROM malfunction | ○ | ○ | ○ | ○ |
| 2 | Indoor / outdoor units communication error | ★ | ★ | ★ | ★ |
| 3 | Zero-crossing signal error | ○ | ○ | ★ | ★ |
| 4 | Indoor fan speed has been out of control | ○ | ○ | ★ | ★ |
| 5 | Open circuit or short circuit of outdoor temperature sensor | X | ○ | X | ★ |
| 6 | Open circuit or short circuit of T1 or T2 temperature sensor | ○ | ○ | ○ | ★ |
| 8 | IPM module protection or IGBT over-strong current protection | X | X | ○ | ★ |
| 9 | Over voltage or too low voltage protection | X | ○ | ○ | ★ |
| 10 | Temperature protection of compressor top | ○ | X | X | ★ |
| 11 | Inverter compressor drive protection | ○ | X | ★ | ★ |
| 12 | Mode conflict | X | ○ | ★ | ★ |

★Flash(at 0.5Hz, Mode conflict at 0.25Hz) ○ light X (off)

9V series+VERTU series+9A series+Corona series+ R series+Y series+ X series

| Display | LED STATUS |
|---------|--|
| E0 | Indoor EEPROM malfunction |
| E1 | Indoor/ outdoor units communication error |
| E2 | Zero-crossing signal error |
| E3 | Indoor fan speed has been out of control |
| E5 | Open circuit or short circuit of outdoor temperature sensor |
| E6 | Open circuit or short circuit of T1 or T2 temperature sensor |
| P0 | IPM module protection or IGBT over-strong current protection |
| P1 | Over voltage or too low voltage protection |
| P2 | Temperature protection of compressor top |
| P4 | Inverter compressor drive protection |
| P5 | Mode conflict |

NEOLA series +PREMIER series +OASIS series:

| Display | Operation lamp flash times | Timer lamp | Failure |
|---------|----------------------------|------------|--|
| E0 | 1 | X | Indoor EEPROM malfunction |
| E1 | 2 | X | Indoor / outdoor units communication error |
| E2 | 3 | X | Zero-crossing signal error |
| E3 | 4 | X | Indoor fan speed has been out of control |
| E4 | 5 | X | Open or short circuit of T1 temperature sensor |
| E5 | 6 | X | Open or short circuit of T2 temperature sensor |
| F1 | 2 | ○ | Open or short circuit of T4 temperature sensor |

| | | | |
|----|---|---|--|
| F2 | 3 | O | Open or short circuit of T3 temperature sensor |
| F3 | 4 | O | Open or short circuit of T5 temperature sensor |
| F4 | 5 | O | Outdoor EEPROM malfunction |
| F6 | 7 | O | Open or short circuit of T2B temperature sensor |
| P0 | 1 | ☆ | IPM module protection or IGBT over-strong current protection |
| P1 | 2 | ☆ | Over voltage or too low voltage protection |
| P2 | 3 | ☆ | Temperature protection of compressor top |
| P4 | 5 | ☆ | Inverter compressor drive protection |
| P5 | 6 | ☆ | Mode conflict |

O (light) X (off) ☆ (flash)

Cassette series:

| Operation | Timer | De-frost | Alarm | LED STATUS |
|-----------|-------|----------|-------|--|
| ★ | X | X | X | Open or short circuit of T1 temperature sensor |
| X | X | ★ | X | Open or short circuit of T2 temperature sensor |
| X | ★ | X | X | Indoor / outdoor units communication error |
| X | X | X | ★ | Full-water malfunction |
| ★ | ★ | X | X | Indoor EEPROM malfunction |
| ★ | X | X | ● | IPM module protection |
| ★ | ● | X | X | Open or short circuit of T3 or T4 temperature sensor |
| ★ | ● | X | ● | Outdoor voltage protection |
| ★ | ★ | ★ | ★ | Temperature protection of compressor top |
| ★ | X | ● | ● | Mode conflict |
| ★ | ● | ● | X | Inverter compressor drive protection |

★ flash, ● light, X extinguished.

Ceiling & Floor series:

| Operation | Timer | De-frost | Alarm | LED STATUS |
|-----------|-------|----------|-------|--|
| ★ | X | X | X | Open or short circuit of T1 temperature sensor |
| X | X | ★ | X | Open or short circuit of T2 temperature sensor |
| X | ★ | X | X | Indoor / outdoor units communication error |
| X | X | X | ★ | Full-water malfunction |
| ★ | ★ | X | X | Indoor EEPROM malfunction |
| ★ | X | X | ● | IPM module protection |
| ★ | ● | X | X | Open or short circuit of T3 or T4 temperature sensor |
| ★ | ● | X | ● | Outdoor voltage protection |
| ★ | X | ● | X | Temperature protection of compressor top |
| ★ | X | ● | ● | Mode conflict |

★ flash, ● light, X extinguished.

A5 Duct series:

| Operation | Timer | De-frost | Alarm | LED STATUS | DISPLAY DIGITAL TUBE |
|-----------|-------|----------|-------|--|----------------------|
| ★ | X | X | X | Open or short circuit of T1 temperature sensor | E0 |
| X | X | ★ | X | Open or short circuit of T2 temperature sensor | E1 |
| X | ★ | X | X | Indoor / outdoor units communication error | E2 |
| X | X | X | ★ | Full-water malfunction | E3 |
| ★ | ★ | X | X | Indoor EEPROM malfunction | E4 |
| ★ | X | X | ● | IPM module protection | E5 |
| ★ | ● | X | X | Open or short circuit of T3 or T4 temperature sensor | E6 |
| ★ | ● | X | ● | Outdoor voltage protection | P0 |
| ★ | ★ | ★ | ★ | Temperature protection of compressor top | P3 |
| ★ | ◎ | X | X | Inverter compressor drive protection | P4 |
| ★ | X | ● | X | Mode conflict | P5 |

★ flash at 5Hz, ● light, X extinguished ◎flash at 0.5Hz

Console series:

| Operation | Timer | De-frost | LED STATUS |
|-----------|-------|----------|--|
| ★ | X | X | Open or short circuit of T1 temperature sensor |
| X | X | ★ | Open or short circuit of T2 temperature sensor |
| X | ★ | X | Indoor / outdoor units communication error |
| ★ | ★ | X | Indoor EEPROM malfunction |
| ★ | X | ★ | IPM module protection |
| ★ | ★ | ★ | Open or short circuit of T3 or T4 temperature sensor |
| ★ | ● | X | Top temperature protection of compressor |
| ★ | ◎ | X | Inverter compressor drive protection |
| ★ | X | ● | Mode conflict |
| ★ | ● | ★ | Indoor fan speed has been out of control |

★ flash at 5Hz, ● light, X extinguished

Outdoor unit error code explanation:
For units(except M5OA-36HRDN1-Q model)

| Display | LED STATUS |
|---------|--|
| E0 | Outdoor EEPROM malfunction |
| E1 | No A Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| E2 | No B Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| E3 | No C Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| E6 | No D Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| E4 | Open or short circuit of outdoor unit temperature sensor |
| E5 | Compressor voltage protection |
| E7 | Communication malfunction between IPM board and outdoor main board |
| P0 | Temperature protection of compressor discharge or compressor top. For M4OC-27HRDN1, M4OC1-27HRDN1-Q,M4OC-36HRDN1-Q,it only means Temperature protection of compressor discharge |
| P1 | High pressure protection(only for M4OC1-27HRDN1-Q, M4OC-27HRDN1-Q,M4OC-36HRDN1-Q) |
| P2 | Low pressure protection(only for M4OC1-27HRDN1-Q, M4OC-27HRDN1-Q,M4OC-36HRDN1-Q) |
| P3 | Current protection of compressor |
| P4 | IPM module protection |
| P6 | High temperature protection of condenser |
| P7 | Inverter compressor drive protection |

For M50A-36HRDN1-Q model

| Display | LED STATUS |
|----------------|---|
| E0 | Outdoor EEPROM malfunction |
| E2 | Indoor / outdoor units communication error |
| E3 | Communication malfunction between IPM board and outdoor main board |
| E4 | Open or short circuit of outdoor unit temperature sensor |
| E5 | Compressor voltage protection |
| E6 | PFC module protection |
| F1 | No A Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| F2 | No B Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| F3 | No C Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| F4 | No D Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| F5 | No E Indoor unit coil outlet temp. sensor or connector of sensor is defective |
| P1 | High pressure protection |
| P2 | Low pressure protection |
| P3 | Current protection of compressor |
| P4 | Temperature protection of compressor discharge |
| P5 | High temperature protection of condenser |
| P6 | IPM module protection |

8.3 Troubleshooting

8.3.1 For the indoor unit

8.3.1.1 Indoor EEPROM malfunction

Shut off the power supply and turn it on 1 minute later. Is it still displaying the error code?

Yes

If the EEPROM chip is welded on PCB, replace the PCB directly. Otherwise, check whether the EEPROM chip plugged in PCB well?

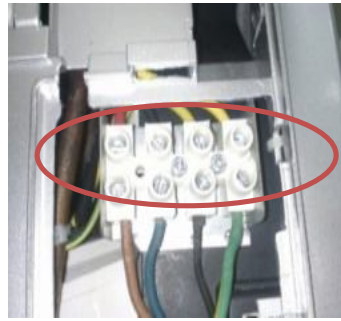
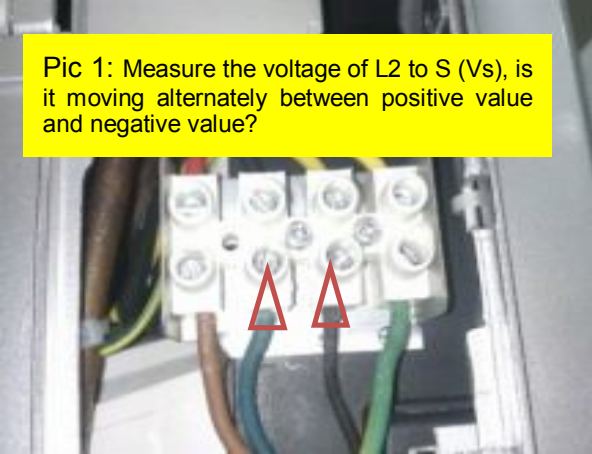
No

Insert the EEPROM well

Yes

Replace the indoor PCB.

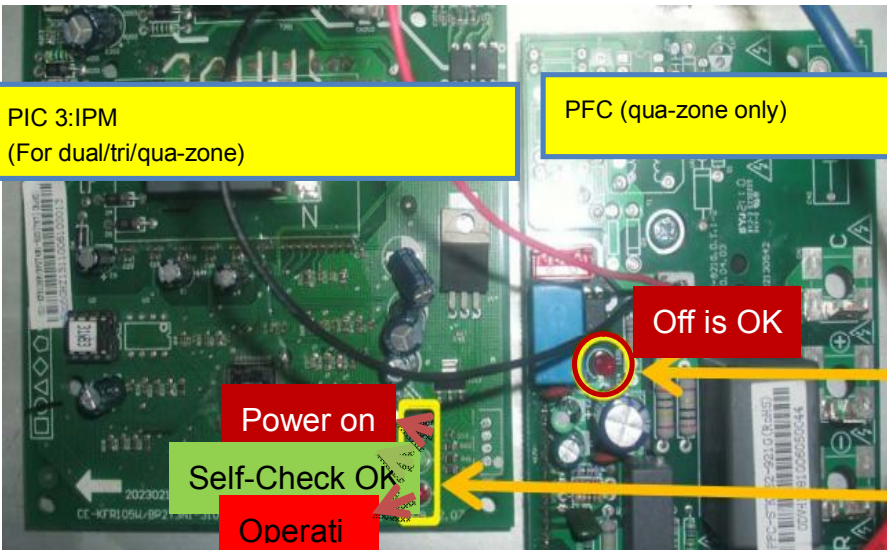
PIC 1: Measure the voltage of L2 to S (Vs), is it moving alternately between positive value and negative value?



PIC 2, Check the wiring.

PIC 3: IPM
(For dual/tri/qua-zone)

PFC (qua-zone only)



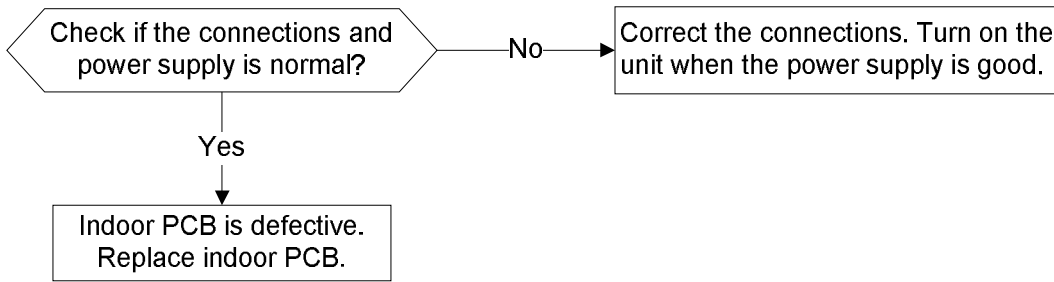
PIC 4: Main board LED when power on and unit standbv.



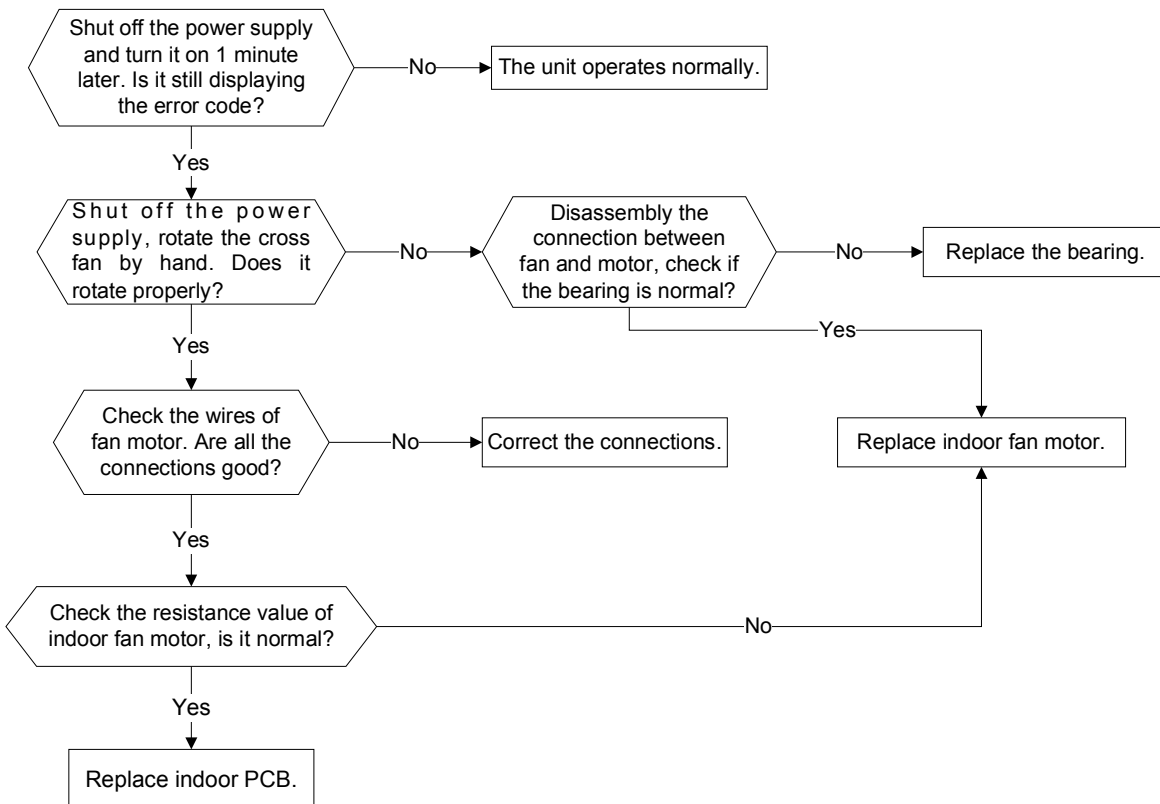
PIC 5: check point button,
press 18 times for check how many indoor units
are connected.



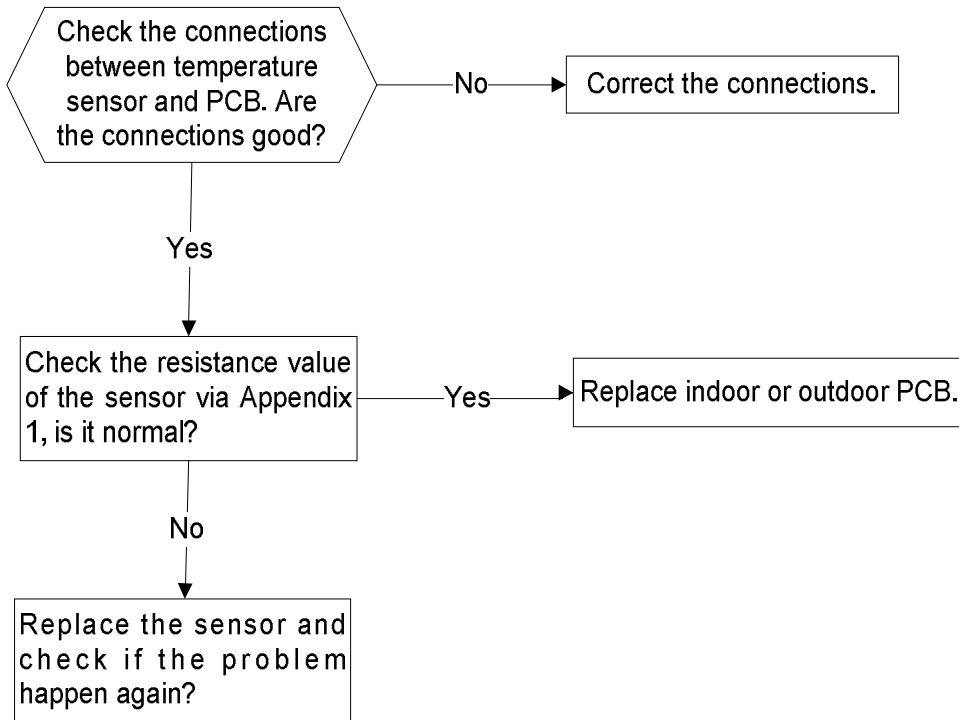
8.3.1.3 Zero-crossing signal error



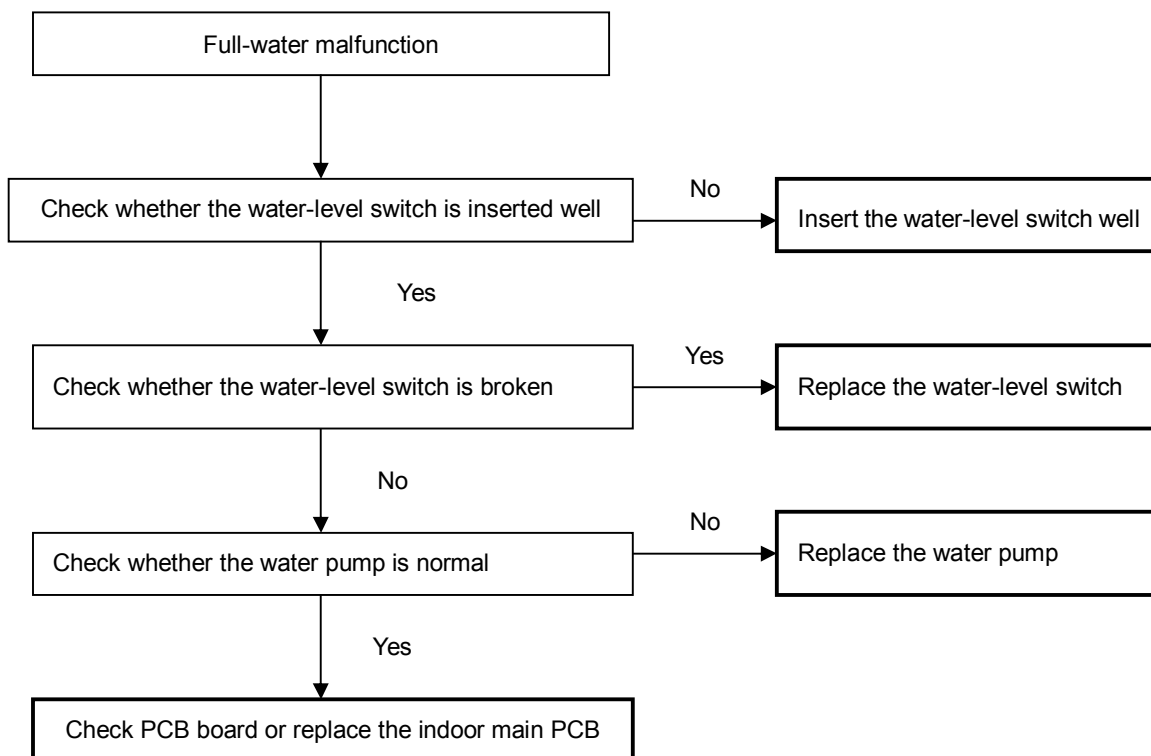
8.3.1.4 Indoor fan speed has been out of control



8.3.1.5 Open or short circuit of temperature sensor.

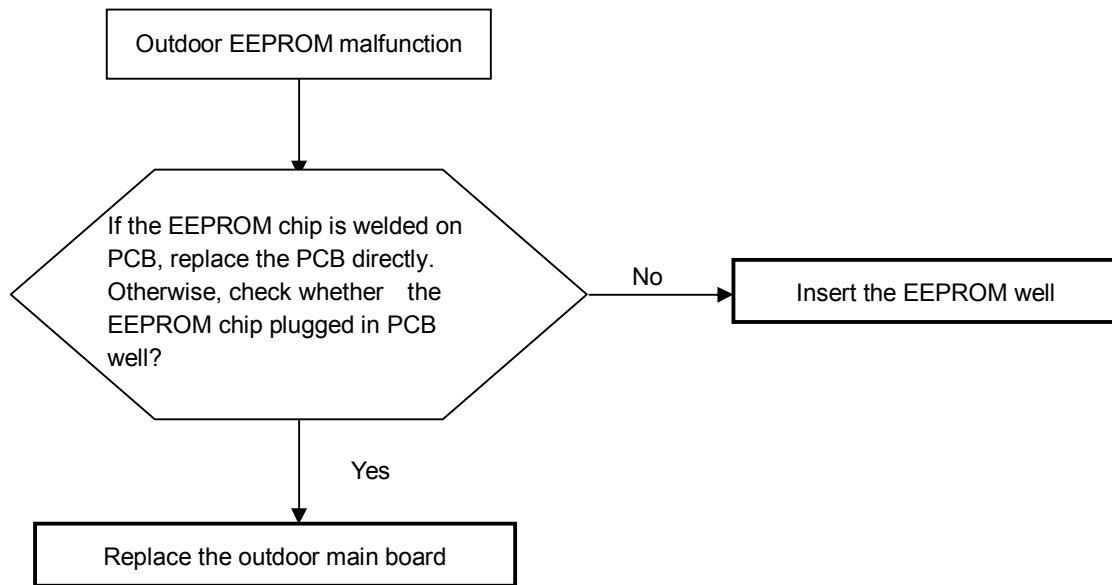


8.3.1.6 Full-water malfunction

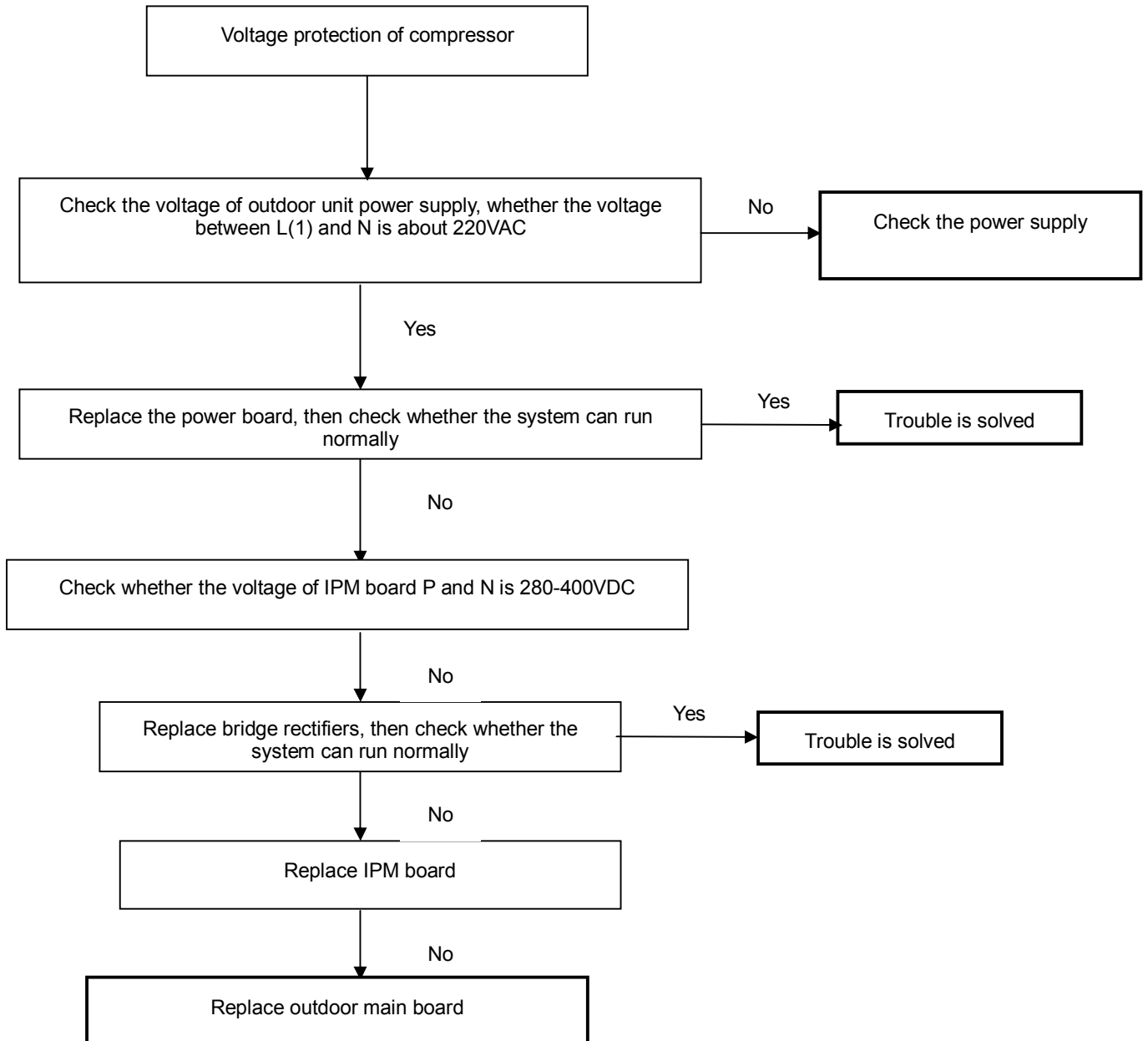


8.3.2 For the outdoor unit

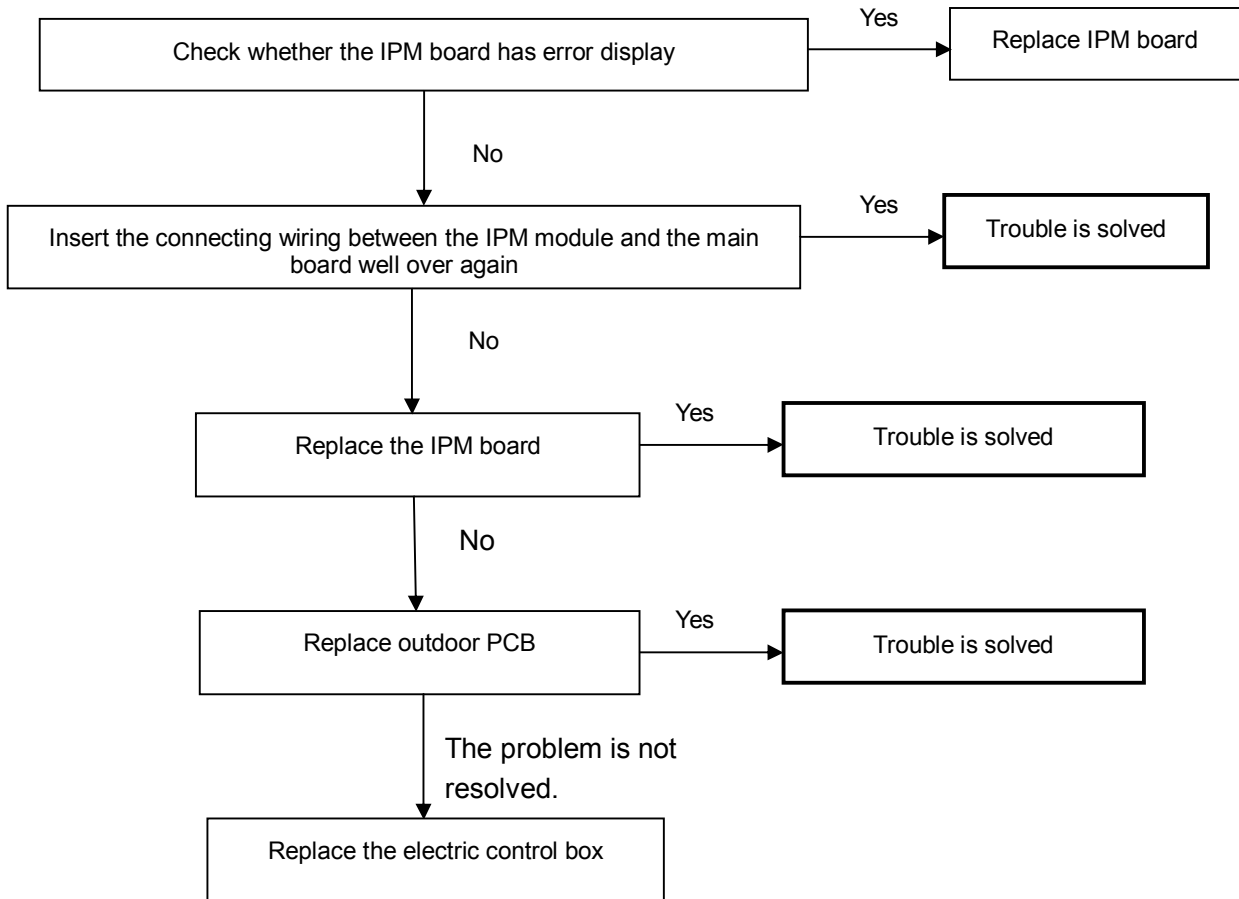
8.3.2 1 Outdoor EEPROM malfunction



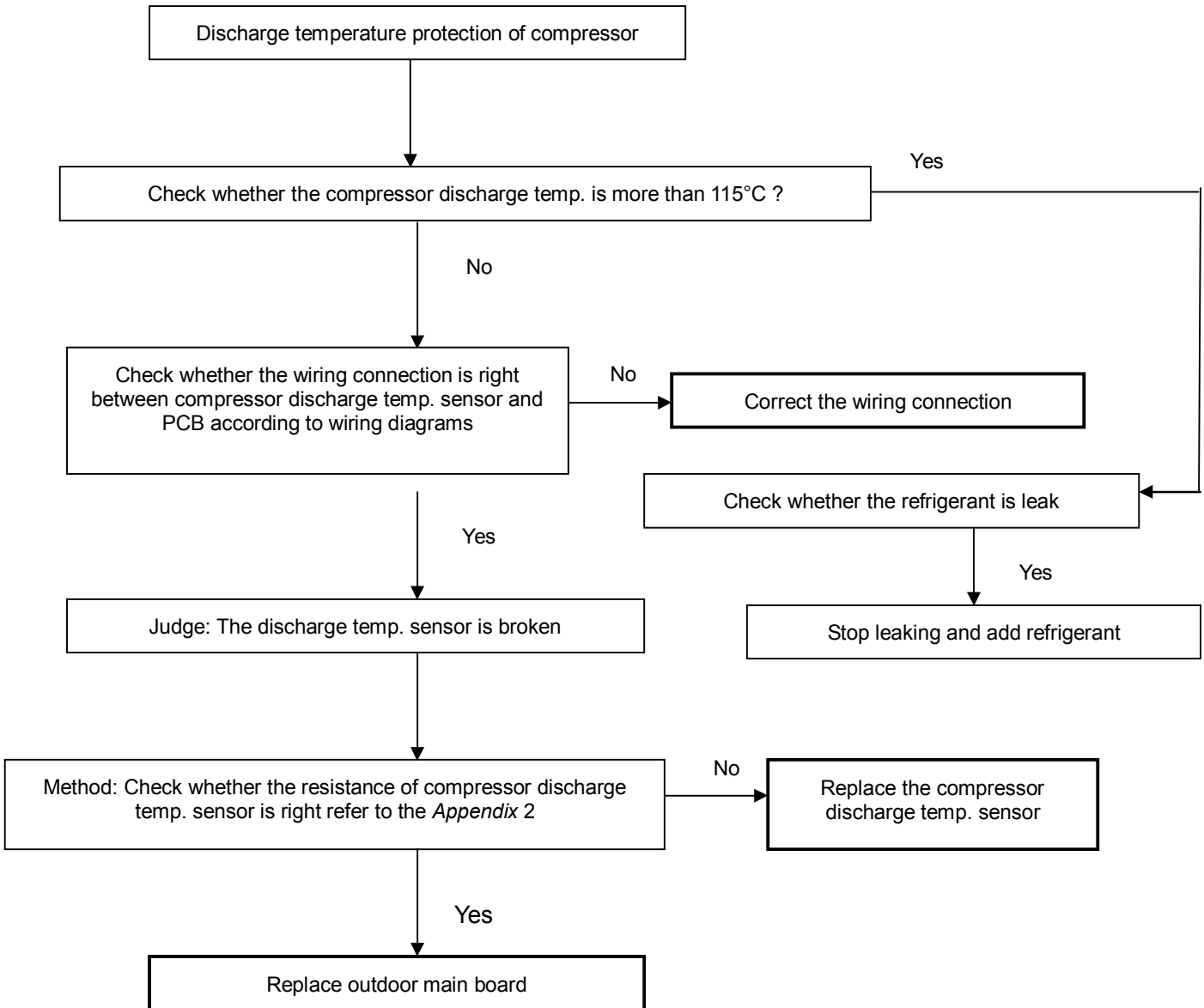
8.3.2.2 Voltage protection of compressor



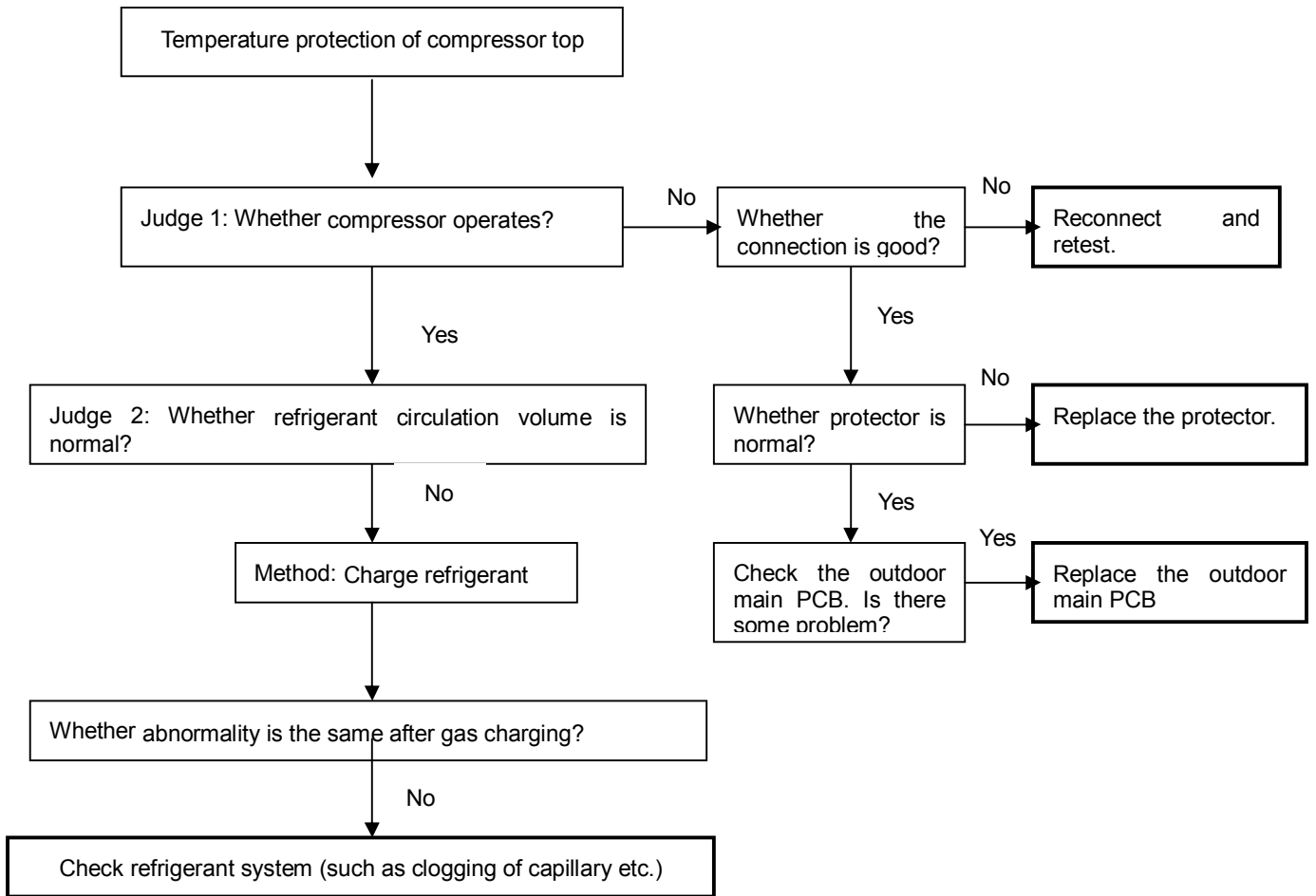
8.3.2.3 Communication malfunction between IPM board and outdoor main board



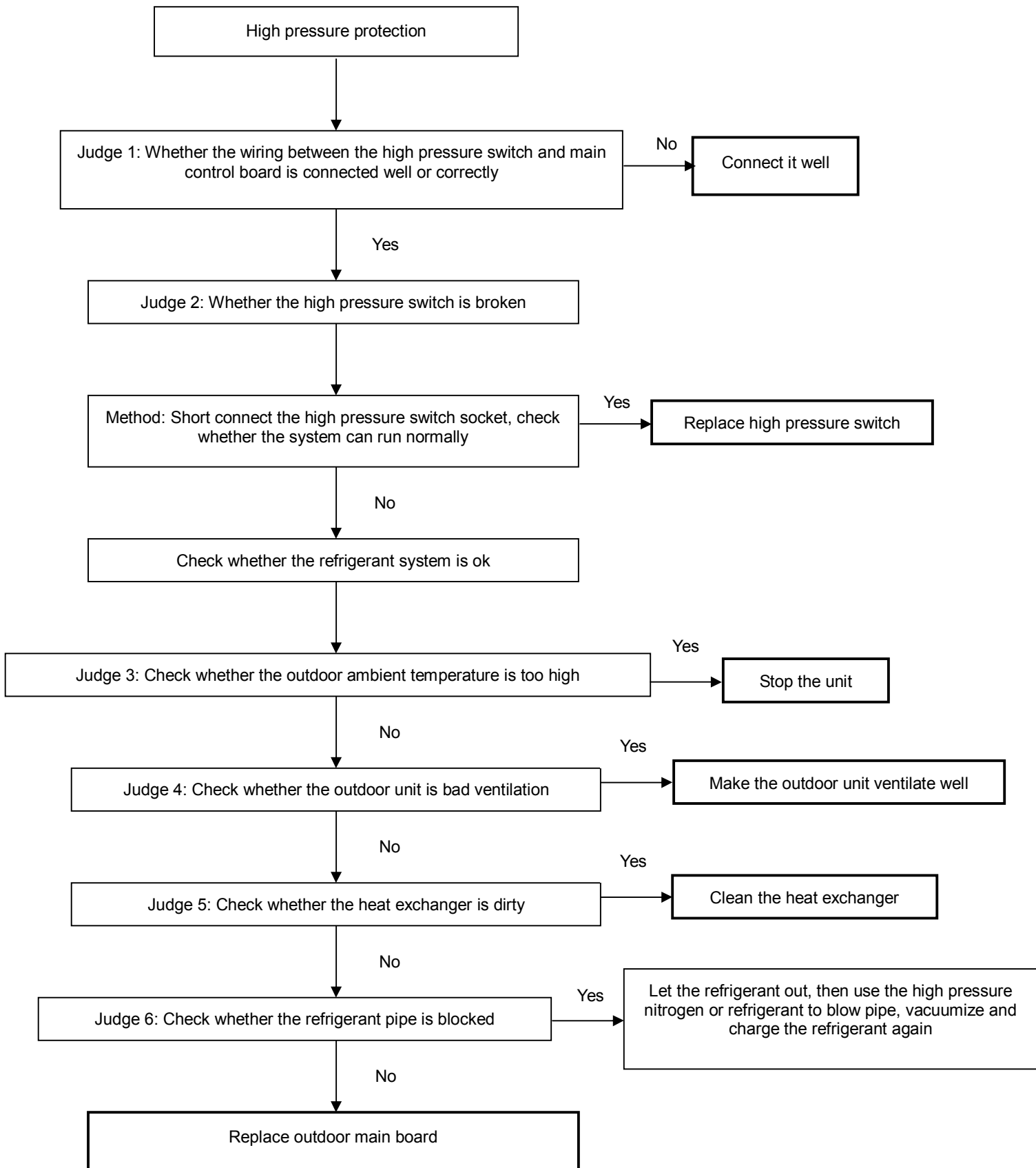
8.3.2.4 Temperature protection of compressor discharge



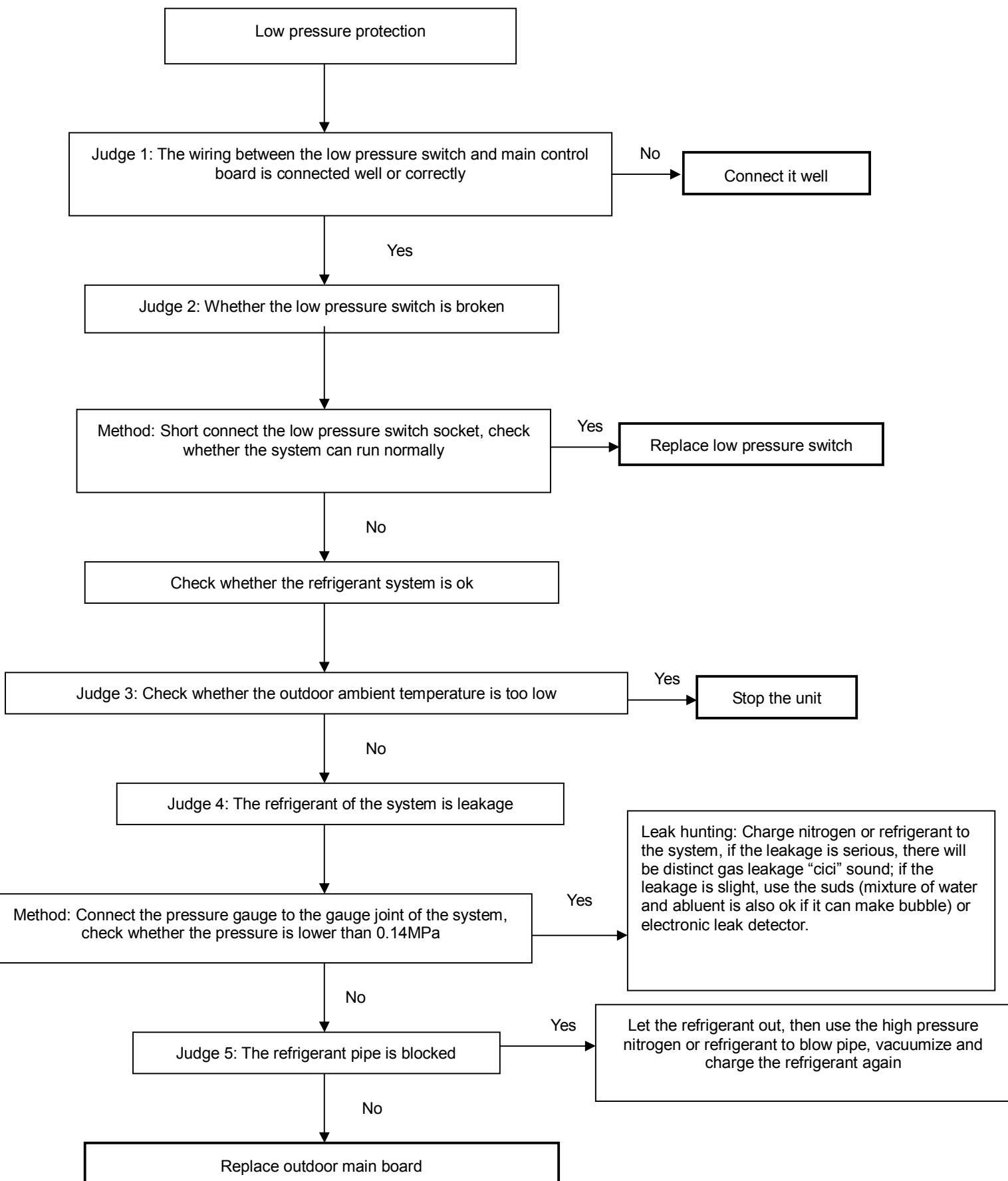
8.3.2.5 Temperature protection of compressor top



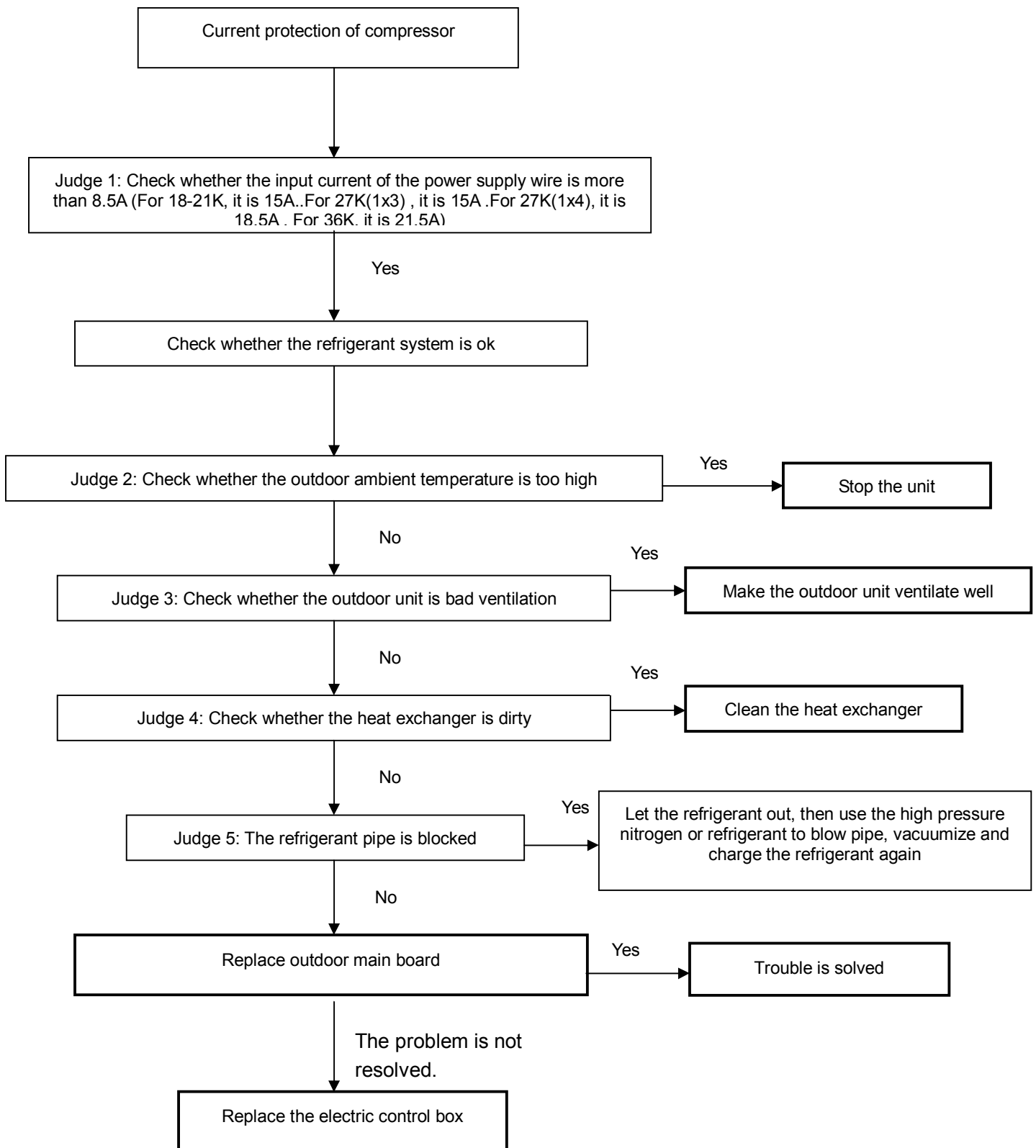
8.3.2.6 High pressure protection(For M4OC1-27HRDN1-Q, M4OC-27HRDN1-Q,M4OC-36HRDN1-Q, M5OA-36HRDN1-Q)



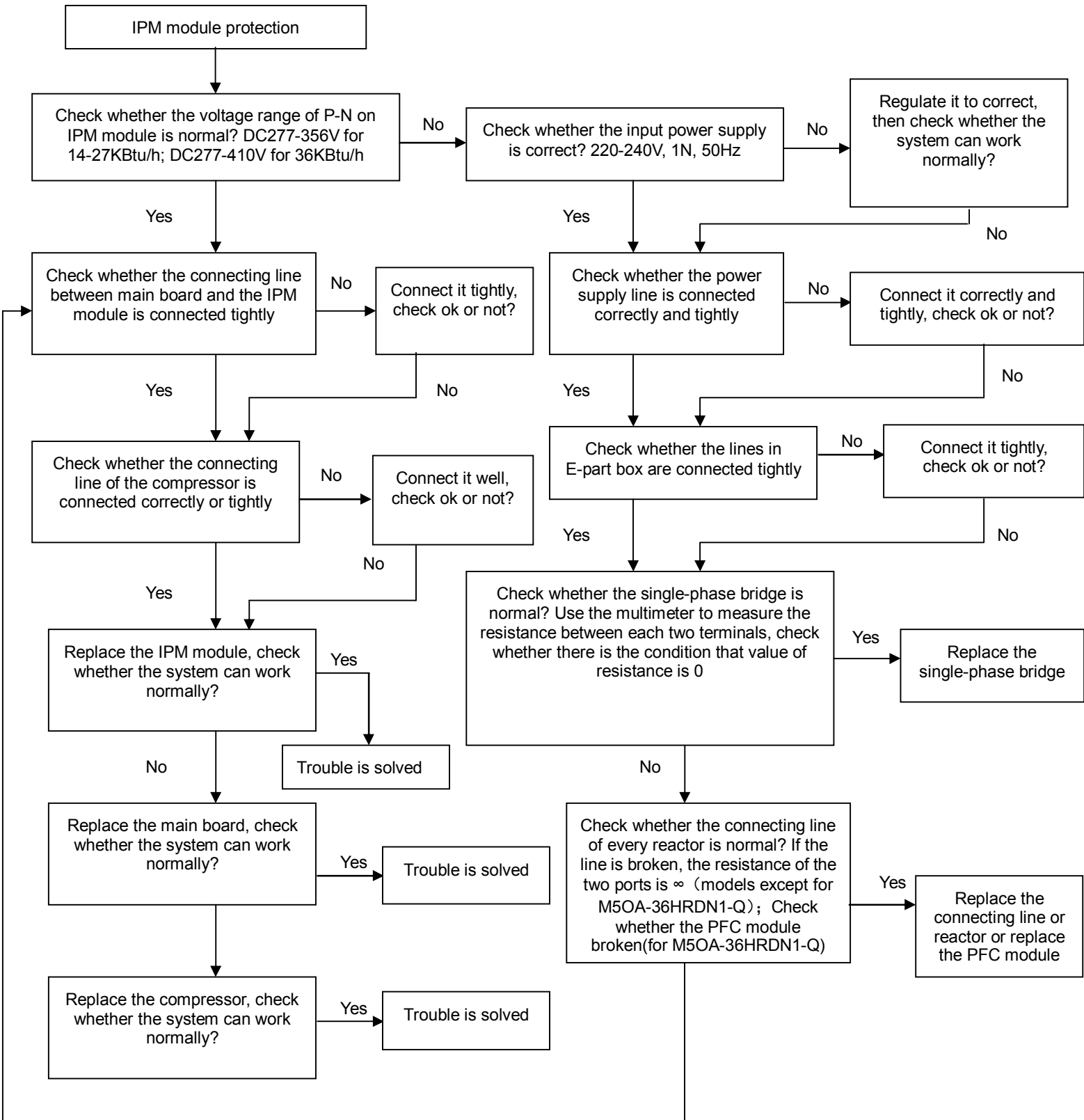
8.3.2.7 Low pressure protection (For M4OC1-27HRDN1-Q, M4OC-27HRDN1-Q, M4OC-36HRDN1-Q, M5OA-36HRDN1-Q)



8.3.2.8 Current protection of compressor

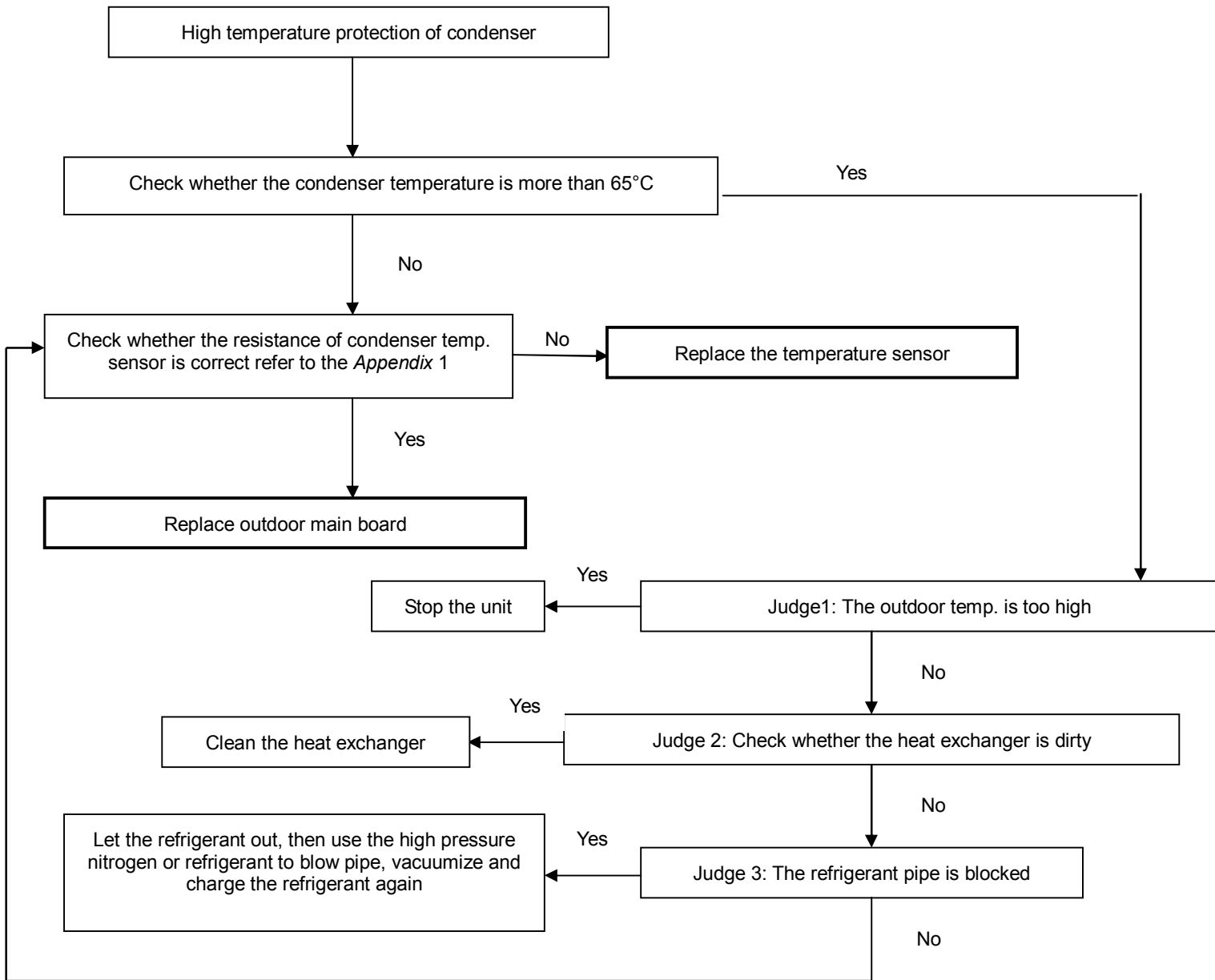


8.3.2.9 IPM module protection

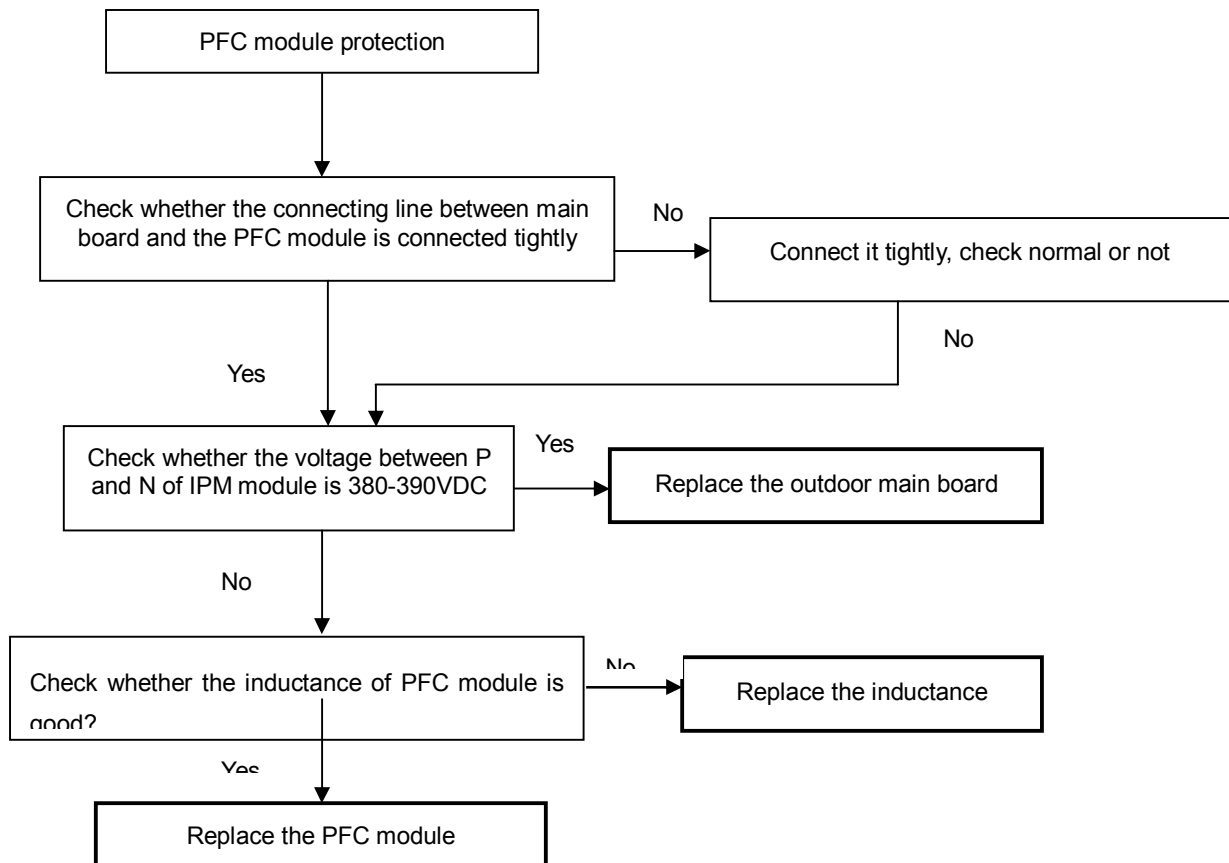


8.3.2.10 High temperature protection of condenser

When outdoor pipe temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. less than 52°C.



8.3.2.11 PFC module protection



8.3.2.12 Inverter compressor drive protection

The trouble shooting is same with one of IPM module protection

Appendix 1 Temperature Sensor Resistance Value Table (°C--K)

| °C | K Ohm | °C | K Ohm | °C | K Ohm | °C | K Ohm |
|-----|---------|----|---------|----|---------|-----|---------|
| -20 | 115.266 | 20 | 12.6431 | 60 | 2.35774 | 100 | 0.62973 |
| -19 | 108.146 | 21 | 12.0561 | 61 | 2.27249 | 101 | 0.61148 |
| -18 | 101.517 | 22 | 11.5000 | 62 | 2.19073 | 102 | 0.59386 |
| -17 | 96.3423 | 23 | 10.9731 | 63 | 2.11241 | 103 | 0.57683 |
| -16 | 89.5865 | 24 | 10.4736 | 64 | 2.03732 | 104 | 0.56038 |
| -15 | 84.2190 | 25 | 10.0000 | 65 | 1.96532 | 105 | 0.54448 |
| -14 | 79.3110 | 26 | 9.55074 | 66 | 1.89627 | 106 | 0.52912 |
| -13 | 74.5360 | 27 | 9.12445 | 67 | 1.83003 | 107 | 0.51426 |
| -12 | 70.1698 | 28 | 8.71983 | 68 | 1.76647 | 108 | 0.49989 |
| -11 | 66.0898 | 29 | 8.33566 | 69 | 1.70547 | 109 | 0.48600 |
| -10 | 62.2756 | 30 | 7.97078 | 70 | 1.64691 | 110 | 0.47256 |
| -9 | 58.7079 | 31 | 7.62411 | 71 | 1.59068 | 111 | 0.45957 |
| -8 | 56.3694 | 32 | 7.29464 | 72 | 1.53668 | 112 | 0.44699 |
| -7 | 52.2438 | 33 | 6.98142 | 73 | 1.48481 | 113 | 0.43482 |
| -6 | 49.3161 | 34 | 6.68355 | 74 | 1.43498 | 114 | 0.42304 |
| -5 | 46.5725 | 35 | 6.40021 | 75 | 1.38703 | 115 | 0.41164 |
| -4 | 44.0000 | 36 | 6.13059 | 76 | 1.34105 | 116 | 0.40060 |
| -3 | 41.5878 | 37 | 5.87359 | 77 | 1.29078 | 117 | 0.38991 |
| -2 | 39.8239 | 38 | 5.62961 | 78 | 1.25423 | 118 | 0.37956 |
| -1 | 37.1988 | 39 | 5.39689 | 79 | 1.21330 | 119 | 0.36954 |
| 0 | 35.2024 | 40 | 5.17519 | 80 | 1.17393 | 120 | 0.35982 |
| 1 | 33.3269 | 41 | 4.96392 | 81 | 1.13604 | 121 | 0.35042 |
| 2 | 31.5635 | 42 | 4.76253 | 82 | 1.09958 | 122 | 0.3413 |
| 3 | 29.9058 | 43 | 4.57050 | 83 | 1.06448 | 123 | 0.33246 |
| 4 | 28.3459 | 44 | 4.38736 | 84 | 1.03069 | 124 | 0.32390 |
| 5 | 26.8778 | 45 | 4.21263 | 85 | 0.99815 | 125 | 0.31559 |
| 6 | 25.4954 | 46 | 4.04589 | 86 | 0.96681 | 126 | 0.30754 |
| 7 | 24.1932 | 47 | 3.88673 | 87 | 0.93662 | 127 | 0.29974 |
| 8 | 22.5662 | 48 | 3.73476 | 88 | 0.90753 | 128 | 0.29216 |
| 9 | 21.8094 | 49 | 3.58962 | 89 | 0.87950 | 129 | 0.28482 |
| 10 | 20.7184 | 50 | 3.45097 | 90 | 0.85248 | 130 | 0.27770 |
| 11 | 19.6891 | 51 | 3.31847 | 91 | 0.82643 | 131 | 0.27078 |
| 12 | 18.7177 | 52 | 3.19183 | 92 | 0.80132 | 132 | 0.26408 |
| 13 | 17.8005 | 53 | 3.07075 | 93 | 0.77709 | 133 | 0.25757 |
| 14 | 16.9341 | 54 | 2.95896 | 94 | 0.75373 | 134 | 0.25125 |
| 15 | 16.1156 | 55 | 2.84421 | 95 | 0.73119 | 135 | 0.24512 |
| 16 | 15.3418 | 56 | 2.73823 | 96 | 0.70944 | 136 | 0.23916 |
| 17 | 14.6181 | 57 | 2.63682 | 97 | 0.68844 | 137 | 0.23338 |
| 18 | 13.9180 | 58 | 2.53973 | 98 | 0.66818 | 138 | 0.22776 |
| 19 | 13.2631 | 59 | 2.44677 | 99 | 0.64862 | 139 | 0.22231 |

Appendix 2

| Unit: °C--K | | | | Discharge temp. sensor table | | | |
|-------------|-------|----|-------|------------------------------|-------|----------------|-------|
| -20 | 542.7 | 20 | 68.66 | 60 | 13.59 | 100 | 3.702 |
| -19 | 511.9 | 21 | 65.62 | 61 | 13.11 | 101 | 3.595 |
| -18 | 483 | 22 | 62.73 | 62 | 12.65 | 102 | 3.492 |
| -17 | 455.9 | 23 | 59.98 | 63 | 12.21 | 103 | 3.392 |
| -16 | 430.5 | 24 | 57.37 | 64 | 11.79 | 104 | 3.296 |
| -15 | 406.7 | 25 | 54.89 | 65 | 11.38 | 105 | 3.203 |
| -14 | 384.3 | 26 | 52.53 | 66 | 10.99 | 106 | 3.113 |
| -13 | 363.3 | 27 | 50.28 | 67 | 10.61 | 107 | 3.025 |
| -12 | 343.6 | 28 | 48.14 | 68 | 10.25 | 108 | 2.941 |
| -11 | 325.1 | 29 | 46.11 | 69 | 9.902 | 109 | 2.86 |
| -10 | 307.7 | 30 | 44.17 | 70 | 9.569 | 110 | 2.781 |
| -9 | 291.3 | 31 | 42.33 | 71 | 9.248 | 111 | 2.704 |
| -8 | 275.9 | 32 | 40.57 | 72 | 8.94 | 112 | 2.63 |
| -7 | 261.4 | 33 | 38.89 | 73 | 8.643 | 113 | 2.559 |
| -6 | 247.8 | 34 | 37.3 | 74 | 8.358 | 114 | 2.489 |
| -5 | 234.9 | 35 | 35.78 | 75 | 8.084 | 115 | 2.422 |
| -4 | 222.8 | 36 | 34.32 | 76 | 7.82 | 116 | 2.357 |
| -3 | 211.4 | 37 | 32.94 | 77 | 7.566 | 117 | 2.294 |
| -2 | 200.7 | 38 | 31.62 | 78 | 7.321 | 118 | 2.233 |
| -1 | 190.5 | 39 | 30.36 | 79 | 7.086 | 119 | 2.174 |
| 0 | 180.9 | 40 | 29.15 | 80 | 6.859 | 120 | 2.117 |
| 1 | 171.9 | 41 | 28 | 81 | 6.641 | 121 | 2.061 |
| 2 | 163.3 | 42 | 26.9 | 82 | 6.43 | 122 | 2.007 |
| 3 | 155.2 | 43 | 25.86 | 83 | 6.228 | 123 | 1.955 |
| 4 | 147.6 | 44 | 24.85 | 84 | 6.033 | 124 | 1.905 |
| 5 | 140.4 | 45 | 23.89 | 85 | 5.844 | 125 | 1.856 |
| 6 | 133.5 | 46 | 22.89 | 86 | 5.663 | 126 | 1.808 |
| 7 | 127.1 | 47 | 22.1 | 87 | 5.488 | 127 | 1.762 |
| 8 | 121 | 48 | 21.26 | 88 | 5.32 | 128 | 1.717 |
| 9 | 115.2 | 49 | 20.46 | 89 | 5.157 | 129 | 1.674 |
| 10 | 109.8 | 50 | 19.69 | 90 | 5 | 130 | 1.632 |
| 11 | 104.6 | 51 | 18.96 | 91 | 4.849 | | |
| 12 | 99.69 | 52 | 18.26 | 92 | 4.703 | | |
| 13 | 95.05 | 53 | 17.58 | 93 | 4.562 | | |
| 14 | 90.66 | 54 | 16.94 | 94 | 4.426 | | |
| 15 | 86.49 | 55 | 16.32 | 95 | 4.294 | B(25/50)=3950K | |
| 16 | 82.54 | 56 | 15.73 | 96 | 4.167 | | |
| 17 | 78.79 | 57 | 15.16 | 97 | 4.045 | R(90°C)=5KΩ±3% | |
| 18 | 75.24 | 58 | 14.62 | 98 | 3.927 | | |
| 19 | 71.86 | 59 | 14.09 | 99 | 3.812 | | |

Appendix 3

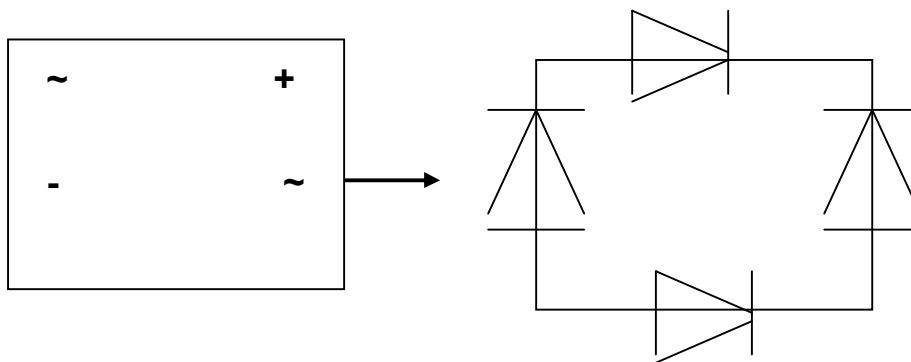
1. Reference voltage data:

- a) Rectifier : Input :220-230V(AC), output :310V(DC)
- b) Inverter module: U,V, W 3ph.

| | Result |
|-----|-------------|
| U-V | 60-150V(AC) |
| U-W | 60-150V(AC) |
| V-W | 60-150V(AC) |
| P-N | DC 310V |

2. Check the Diode Bridge component (In wiring diagram, rectifier)

Remark: If this part is abnormal, the LED will not light.



| Multi-meter | | Result | |
|-------------|---|--------------------|---------------------|
| | | Forward Resistance | Backward Resistance |
| + | - | Infinite | Infinite |
| ~ | + | ~1.7M ohm | Infinite |
| ~ | | | |
| - | ~ | ~1.7M ohm | Infinite |
| | ~ | | |