

Service Manual Flow Logic (MINI) YCV Series R410A English Manual



IMPORTANT NOTE:

Read this manual carefully before installing or operating your new air conditioning unit. Make sure to save this manual for future reference.

20.AW.YCV.8-18kW.R410A.SM.EN.05.16.Rev01





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1. Features

DC Inverter Twin Rotary Compressor

1) Realize high efficiency and compact designed compressor by joint wrap & earths metal magnet motor.

2) Wide range inverter compressors would satisfy the customer's innovative requirement and design.

DC Inverter Motor

DC fan motor speed can be adjusted from 0~1000 r/min, it can improve the unit efficiency, at the same time, the unit can realize low ambient cooling operation.

Precise Control

PID control adjusts the output of compressor and the open degree of EEV, balances the indoor refrigerant flow, realizes the linear output, creates a comfortable environment. The temperature could be controlled precisely.



180° Vector Control Technology

Using power resistance to detect the rotor position of compressor, results in the consistency of the compressor working current and current sine waves, improve power efficiency about 17%.



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Parts Instroduction (AWAU-YCV150/180-H13)



1. Control the compressor running frequency by temp. Sensor, more precise and prompt than conventional control system;

Protections: Pressure, temp., compressor, fan motor, refrigerant, oil quantity etc. Realize perfect performance; Malfunction self-diagnose.

- 2. DC fan motor (AWAU-YCV150/180-H13).
- 3. DC inverter compressor, high efficiency.
- 4. Single set valve, easy to installation and save installation time.





| Model | | | AWAU-YCV080-H11 | AWAU-YCV125-H11 |
|-------------------|------------------------|---------|-----------------------|-----------------------|
| Power supply | | Ph/V/Hz | 1/220~230/50 | 1/220~230/50/60 |
| | Rated capacity | kW | 8 | 12.5 |
| | Rated capacity | kBtu/h | 27.3 | 42.7 |
| | Rated power input | kW | 2.08 | 3.3 |
| Cooling | Max. power input | kW | 4 | 7.1 |
| | EER | | 3.85 | 3.79 |
| | Rated current | A | 10 | 15.9 |
| | Max. current | A | 19.2 | 34.1 |
| | Rated capacity | kW | 9.5 | 14.0 |
| | Rated capacity | kBtu/h | 32.4 | 47.8 |
| | Rated power input | kW | 2.1 | 3.4 |
| Heating | Max. power input | kW | 3.84 | 6.9 |
| | COP | | 4.52 | 4.12 |
| | Rated current | A | 10.1 | 16.3 |
| | Max. current | A | 18.5 | 33.2 |
| | Brand | | MITSUBISHI ELECTRIC | MITSUBISHI ELECTRIC |
| | Model | | TNB220FLHMC | MNB42FFAMC-L |
| | Туре | | Rotary | Rotary |
| | Compressor quantity | | 1 INV | 1 INV |
| | Capacity | W | 7130 | 13780 |
| Compressor | Power input | W | 2200 | 4310 |
| 001110103301 | Rated current (RLA) | A | 9.7 | 15.8 |
| | Speed | rps | 60 | 60 |
| | Crankcase heater | W | 25 | 28 |
| | Refrigerant oil brand | | Itochu.,LTD.,Shanghai | Itochu.,LTD.,Shanghai |
| | Refrigerant oil type | | FV50S | FV50S |
| | Refrigerant oil charge | ml | 670 | 1400 |
| | Brand | | BROAD OCEAN | BROAD OCEAN/NIDEC |
| | Model | | Y6S643C831 | ZWK511B51006 |
| | Voltage | | 220-230 | 310 |
| | IP class | | IP44 | IP42 |
| | Туре | | AC | DC |
| Outdoor fan motor | Insulation class | | В | E |
| | Safe class | | 1 | I |
| | Power input | W | 192 | 225*2 |
| | Output | W | 100 | 180*2 |
| | Rated current | A | 0.88 | 0.6 |
| | Capacitor | μF | 5 | / |
| | Speed | rpm | 870 | 850 |
| | Brand | | SHUNWEI | LANGDI |
| | | | / | |
| Outdoor fan | | | Plastic | Plastic |
| | i ype | | Axiai | Axial |
| | Diameter | mm | 482 | 450 |
| | Height | mm | 150 | 150 |

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| | Model | | AWAU-YCV080-H11 | AWAU-YCV125-H11 |
|--|--------------------------------|-----------------|-------------------------------------|------------------------------------|
| | Number of rows | | 2 | 2 |
| | Tube pitch (a)×row pitch (b) | mm | 21*18.186 | 21*18.186 |
| | Fin spacing | mm | 1.4 | 1.40 |
| | Fin type (code) | | Corrugated | Corrugated |
| | Fin coating type | Optional | Hydrophilic aluminum | Hydrophilic aluminum |
| Outdoor coil | Salt spray test duration | Hour | 500 | 500 |
| | Tube outside dia. and type | | Internal thread copper tube | Internal thread copper tube |
| | | mm | Φ7 | Φ7 |
| | Coil length×height | mm | 955×792 | 970×1197 |
| | Number of circuits | | 6 | 7 |
| | Coating type | | Powder Coating | Powder Coating |
| Cabinet coating | Salt spray test duration | Hour | 500 | 500 |
| Cabinet coating | Sheet metal material | | Hot zinc plate | Hot zinc plate |
| | Sheet metal thickness | mm | 0.8 | 0.8 |
| Control panel enclo | osure IP class | Standard | IP24 | IP24 |
| Outdoor air flow | | m³/h | 3500 | 6500 |
| Outdoor sound level (sound pressure level) | | dB (A) | 54 | 58 |
| Outdoor sound level (sound power level) | | dB (A) | 65 | 69 |
| | Dimension (W*H*D) | mm | 960/340/830 | 960/340/1250 |
| Outdoor unit | Packing (W*H*D) | mm | 1095×410×945 | 1095×410×1400 |
| | Net weight | kg | 70 | 99 |
| | Gross weight | kg | 76 | 107 |
| Dofrigorant | Туре | | R410A | R410A |
| Reingerant | Charged volume | kg | 2.4 | 3.8 |
| Throttle type | | | EXV | EXV |
| Design pressure | | MPa | 4.15 | 4.15 |
| | Liquid pipe | mm | 9.52 | 9.52 |
| | Gas pipe | mm | 15.88 | 19.05 |
| | Total pipe length | m | 100 | 150 |
| Refrigerant piping | Max. pipe length | m | 50 | 70 |
| | Max. Diff. indoor/outdoor unit | m | 30(Outdoor high 20(Indoor higher | er than indoor) r than outdoor) |
| | Max. Diff. indoor/indoor unit | m | 10 | 10 |
| Connectable indoo | r unit ratio | % | 50%~130% | 50%~130% |
| Maximum indoor u | nits | Piece | 5 | 8 |
| Connection wiring | Power wiring | mm ² | 6 | 16 |
| Connection wining | Signal wiring | mm ² | Shield wire:(0.75-2)*2 | Shield wire:(0.75-2)*2 |
| Operation range | | °C | Cooling: 10~48 Heating: -15~21 | Cooling: -5~48 Heating: -15~21 |

Nominal condition:

Indoor temperature (cooling): 27 DB(°C)/19 WB(°C), indoor temperature (heating): 20 DB(°C)/14.5 WB(°C). Outdoor temperature (cooling): 35 DB(°C)/24 WB(°C), outdoor temperature (heating): 7 DB(°C)/6 WB(°C).

The data is measured with 7.5m equivalent pipe and 0m height difference.

The noise level will be measured in the third octave band limited values in the semi-anechoic chamber, using a real time analyser calibrated sound intensity meter. It is a sound pressure noise level.





| | Model | AWAU-YCV150-H11 | |
|-------------------|------------------------|-----------------|-----------------------|
| Power supply | | Ph/V/Hz | 1/220~230/50/60 |
| | Rated capacity | kW | 15 |
| | Rated capacity | kBtu/h | 51.2 |
| | Rated power input | kW | 3.98 |
| Cooling | Max. power input | kW | 7.1 |
| 5 | EER | | 3.77 |
| | Rated current | A | 19.1 |
| | Max. current | A | 34.1 |
| | Rated capacity | kW | 17.0 |
| | Rated capacity | kBtu/h | 58.0 |
| | Rated power input | kW | 3.9 |
| Heating | Max. power input | kW | 6.9 |
| | COP | | 4.35 |
| | Rated current | A | 18.8 |
| | Max. current | A | 33.2 |
| | Brand | | MITSUBISHI ELECTRIC |
| | Model | | MNB42FFAMC-L |
| | Туре | | Rotary |
| | Compressor quantity | 1 | 1 INV |
| | Capacity | W | 13780 |
| | Power input | W | 4310 |
| Compressor | Rated current (RLA) | A | 15.8 |
| | Speed | rps | 60 |
| | Crankcase heater | W | 28 |
| | Refrigerant oil brand | | Itochu.,LTD.,Shanghai |
| | Refrigerant oil type | | FV50S |
| | Refrigerant oil charge | ml | 1400 |
| | Brand | | BROAD OCEAN/NIDEC |
| | Model | | ZWK511B51006 |
| | Voltage | | 310 |
| | IP class | | IP42 |
| | Туре | | DC |
| Outdoor fon motor | Insulation class | | E |
| | Safe class | | I |
| | Power input | W | 225*2 |
| | Output | W | 180*2 |
| | Rated current | A | 0.6 |
| | Capacitor | μF | 1 |
| | Speed | rpm | 850 |
| | Brand | | LANGDI |
| | Model | | 1 |
| Outdoor fan | Material | | Plastic |
| | Туре | | Axial |
| | Diameter | mm | 450 |
| | Height | mm | 150 |





| | Model | | AWAU-YCV150-H11 |
|--|--------------------------------|-----------------|-----------------------------------|
| | Number of rows | | 2 |
| | Tube pitch (a)×row pitch (b) | mm | 21*18.186 |
| | Fin spacing | mm | 1.40 |
| | Fin type (code) | | Corrugated |
| Outdoor coil | Fin coating type | Optional | Hydrophilic aluminum |
| | Salt spray test duration | Hour | 500 |
| | Tube cutaide die and ture | | Internal thread copper tube |
| | Tube outside dia. and type | mm | Φ7 |
| | Coil length×height | mm | 970×1197 |
| | Number of circuits | | 7 |
| | Coating type | | Powder Coating |
| Cabinet coating | Salt spray test duration | Hour | 500 |
| | Sheet metal material | | Hot zinc plate |
| | Sheet metal thickness | mm | 0.8 |
| Control panel enclosure IP class | | Standard | IP24 |
| Outdoor air flow | | m³/h | 6500 |
| Outdoor sound level (sound pressure level) | | dB (A) | 58 |
| Outdoor sound level (sound power level) | | dB (A) | 69 |
| | Dimension (W*H*D) | mm | 960/340/1250 |
| | Packing (W*H*D) | mm | 1095×410×1400 |
| | Net weight | kg | 99 |
| | Gross weight | kg | 107 |
| Defrigerent | Туре | | R410A |
| Reingerant | Charged volume | kg | 3.8 |
| Throttle type | | | EXV |
| Design pressure | | MPa | 4.15 |
| | Liquid pipe | mm | 9.52 |
| | Gas pipe | mm | 19.05 |
| Defrigerent nining | Total pipe length | m | 150 |
| | Max. pipe length | m | 70 |
| | Max. Diff. indoor/outdoor unit | m | |
| | Max. Diff. indoor/indoor unit | m | 10 |
| Connectable indoo | r unit ratio | % | 50%~130% |
| Maximum indoor u | nits | Piece | 8 |
| Connection wiring | Power wiring | mm ² | 16 |
| | Signal wiring | mm ² | Shield wire:(0.75-2)*2 |
| Operation range | | °C | Cooling: -5~48 Heating: -15~21 |

Nominal condition:

Indoor temperature (cooling): 27 DB(°C)/19 WB(°C), indoor temperature (heating): 20 DB(°C)/14.5 WB(°C). Outdoor temperature (cooling): 35 DB(°C)/24 WB(°C), outdoor temperature (heating): 7 DB(°C)/6 WB(°C). The data is measured with 7.5m equivalent pipe and 0m height difference.

The noise level will be measured in the third octave band limited values in the semi-anechoic chamber, using a real time analyser calibrated sound intensity meter. It is a sound pressure noise level.





| Model | | | AWAU-YCV150-H13 | AWAU-YCV180-H13 |
|-------------------|------------------------|---------|-----------------------|-----------------------|
| Power supply | | Ph/V/Hz | 3/380~400/50/60 | 3/380~400/50/60 |
| | Rated capacity | kW | 15 | 18 |
| | Rated capacity | kBtu/h | 51.2 | 61.4 |
| | Rated power input | kW | 3.98 | 5.19 |
| Cooling | Max. power input | kW | 7.1 | 7.3 |
| | EER | | 3.77 | 3.47 |
| | Rated current | A | 6.3 | 8.2 |
| | Max. current | A | 11.2 | 11.6 |
| | Rated capacity | kW | 17.0 | 20.0 |
| | Rated capacity | kBtu/h | 58.0 | 68.2 |
| | Rated power input | kW | 3.9 | 5.1 |
| Heating | Max. power input | kW | 6.9 | 7.1 |
| | COP | | 4.35 | 3.90 |
| | Rated current | A | 6.2 | 8.1 |
| | Max. current | A | 10.9 | 11.2 |
| | Brand | | MITSUBISHI ELECTRIC | MITSUBISHI ELECTRIC |
| | Model | | MNB42FFDMC-L | MNB42FFDMC-L |
| | Туре | | Rotary | Rotary |
| | Compressor quantity | | 1 INV | 1 INV |
| | Capacity | W | 13780 | 13780 |
| Comprosoor | Power input | W | 4060 | 4060 |
| Compressor | Rated current (RLA) | A | 12.3 | 12.3 |
| | Speed | rps | 60 | 60 |
| | Crankcase heater | W | 28 | 28 |
| | Refrigerant oil brand | | ltochu.,LTD.,Shanghai | Itochu.,LTD.,Shanghai |
| | Refrigerant oil type | | FV50S | FV50S |
| | Refrigerant oil charge | ml | 1400 | 1400 |
| | Brand | | BROAD OCEAN/NIDEC | BROAD OCEAN/NIDEC |
| | Model | | ZWK511B51006 | ZWK511B51006 |
| | Voltage | | 310 | 310 |
| | IP class | | IP44 | IP44 |
| | Туре | | DC | DC |
| Outdoor fan motor | Insulation class | | E | E |
| | Safe class | | I | I |
| | Power input | W | 225*2 | 225*2 |
| | Output | W | 180*2 | 180*2 |
| | Rated current | A | 0.6 | 0.6 |
| | Capacitor | μF | / | / |
| | Speed | rpm | 850 | 850 |
| | Brand | | LANGDI | LANGDI |
| | Model | | / | / |
| Outdoor fan | Material | | Plastic | Plastic |
| | Туре | | Axial | Axial |
| | Diameter | mm | 450 | 450 |
| | Height | mm | 150 | 150 |





| | Model | | AWAU-YCV150-H13 | AWAU-YCV180-H13 |
|--|--------------------------------|-----------------|------------------------------------|--------------------------------------|
| | Number of rows | | 2 | 2 |
| | Tube pitch (a)×row pitch (b) | mm | 21*18.186 | 21*18.186 |
| | Fin spacing | mm | 1.40 | 1.40 |
| | Fin type (code) | | Corrugated | Corrugated |
| Outdoor call | Fin coating type | Optional | Hydrophilic aluminum | Hydrophilic aluminum |
| Outdoor coll | Salt spray test duration | Hour | 500 | 500 |
| | Tala and the Parameters | | Internal thread copper tube | Internal thread copper tube |
| | Tube outside dia. and type | mm | Φ7 | Φ7 |
| | Coil length×height | mm | 970×1197 | 970×1197 |
| | Number of circuits | | 7 | 7 |
| | Coating type | | Powder Coating | Powder Coating |
| Cabinat agating | Salt spray test duration | Hour | 500 | 500 |
| Cabinet coating | Sheet metal material | | Hot zinc plate | Hot zinc plate |
| | Sheet metal thickness | mm | 0.8 | 0.8 |
| Control panel enclosure IP class | | Standard | IP24 | IP24 |
| Outdoor air flow | | m³/h | 6500 | 6500 |
| Outdoor sound level (sound pressure level) | | dB (A) | 58 | 59 |
| Outdoor sound level (sound power level) | | dB (A) | 69 | 70 |
| Outdoor unit | Dimension (W*H*D) | mm | 960/340/1250 | 960/340/1250 |
| | Packing (W*H*D) | mm | 1095×410×1400 | 1095×410×1400 |
| | Net weight | kg | 99 | 99 |
| | Gross weight | kg | 107 | 107 |
| Defrigerent | Туре | | R410A | R410A |
| Reingerant | Charged volume | kg | 3.8 | 3.8 |
| Throttle type | | | EXV | EXV |
| Design pressure | | MPa | 4.15 | 4.15 |
| | Liquid pipe | mm | 9.52 | 9.52 |
| | Gas pipe | mm | 19.05 | 19.05 |
| | Total pipe length | m | 150 | 150 |
| Refrigerant piping | Max. pipe length | m | 70 | 70 |
| | Max. Diff. indoor/outdoor unit | m | 30(Outdoor hig) 20(Indoor highe | her than indoor) er than outdoor) |
| | Max. Diff. indoor/indoor unit | m | 10 | 10 |
| Connectable indoo | r unit ratio | % | 50%~130% | 50%~130% |
| Maximum indoor u | nits | Piece | 8 | 9 |
| Connection wining | Power wiring | mm ² | 4 | 4 |
| Connection wiring | Signal wiring | mm ² | Shield wire:(0.75-2)*2 | Shield wire:(0.75-2)*2 |
| Operation range | | °C | Cooling: -5~48 Heating: -15~21 | Cooling: -5~48 Heating: -15~21 |

Nominal condition:

Indoor temperature (cooling): 27 DB(°C)/19 WB(°C), indoor temperature (heating): 20 DB(°C)/14.5 WB(°C). Outdoor temperature (cooling): 35 DB(°C)/24 WB(°C), outdoor temperature (heating): 7 DB(°C)/6 WB(°C).

The data is measured with 7.5m equivalent pipe and 0m height difference.

The noise level will be measured in the third octave band limited values in the semi-anechoic chamber, using a real time analyser calibrated sound intensity meter. It is a sound pressure noise level.





AWAU-YCV080-H11



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AWAU-YCV125-H11 AWAU-YCV150-H11 AWAU-YCV150/180-H13



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| Part name | Model | Sign | Function | Date | |
|----------------------------|---|------|---|---|--|
| | AWAU-YCV080-H11 | | | Motor resistance (at 20°C): 0.88Ω | |
| Compressor | AWAU-YCV125-H11 AWAU-YCV150-H11 | | Capacity control, meet indoor load request by adjusting the frequency | Motor resistance (at 20°C): 0.29Ω | |
| | AWAU-YCV150-H13 AWAU-YCV180-H13 | | | Motor resistance (at 20°C): 0.53Ω | |
| | A1 1 | HP | High pressure protection | 4.15Mpa, OFF | |
| Pressure switch | | LP | Low pressure protection | 0.05Mpa, OFF | |
| Electronic expansion valve | ALL | PMV | In heating, refrigerant flow control | ¢ 2.4 | |
| Solenoid valve | A1 1 | SV1 | Keep balance of high/low pressure when compressor starts up or stops | | |
| | ALL | SV2 | Refrigerant jet protection when discharging temp. is too high | AC220V | |
| 4-way valve | ALL | 4WV | Change over between cooling and heating | AC220V, electrified in heat; not electrified in cooling or defrosting | |
| | | Te | Check frost condition of outdoor heat exchanger | R (25°C)=10K B (25/50°C)=3700K | |
| | ALL | Ts | Detect the suction temp. of compressor | | |
| Temp. sensor | | Тс | Check the temp. of main pipe of condenser gas pipe control PMV in heating | | |
| | | Та | Detect ambient temp. set primary setting for fan speed target pressure and PMV open angle | | |
| | | Td | Detect the discharging temp. of compressor | R (80°C)=50K B (25/80°C)=4450K | |
| | AWAU-YCV080-H11 | | | 25W, 220V | |
| Heater | Heater AWAU-YCV125-H11 AWAU-YCV150-H11 AWAU-YCV150-H13 AWAU-YCV180-H13 | | Used to heat oil in compressor | 28W, 220V | |

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AWAU-YCV080-H11





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AWAU-YCV125-H11 AWAU-YCV150-H11 AWAU-YCV150-H13 AWAU-YCV180-H13











13 —

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AWAU-YCV080-H11





minutes before checking control box, and make sure the voltage between P and N below 20V.

[NOTES]

•Forbid connecting the power wire to the "P" and "Q", otherwise the control board will be damaged.

- •Please check the power firstly before test , and make sure the crankcase heater powering on for 12 hours at least to protecting compressor.
- •The switch BM1-1 is used for locking the indoor units number, the initial situation is "OFF". After power on, the display board will display 【U**】, "**" indicates the number of indoor units that the outdoor unit can communicate with. If it can match the actual number of indoor units, please change "OFF" to "ON", or else fix the communication problem firstly.

| Def. | Display | Indication |
|--------------------------|---------|--------------------------------------|
| Indoor units quantity | U** | **:NUM of the connected indoor units |
| Outdoor | 3.0P | Capability:YCV080 |
| unit | 6.0P | Capability:YCV125/150 |
| capability | 7.0P | Capability:YCV180 |
| Power | 220 | Single phase power type |
| type | 380 | Three phase power type |

[BM Indication]

| BM | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | Cap. | 0:0FF |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|---------|
| BM1 | - | 0 | 0 | 1 | 0 | 0 | 0 | 0 | | -:FIELD |
| BM2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | YCV080 | SET |

Wire Colour:

B:Black

Y:Yellow

W:White BL:Blue

[Symbol Signification]

| _ • <i>j</i> · · · · • | e. e.g.me | | |
|-------------------------------|-------------------|---------|----------------------------|
| Symbol | Signification | Symbol | Signification |
| ACL | Live Wire | HPS | High pressure switch |
| ACN | Neutral Wire | LPS | Low pressure switch |
| HEATER | Compressor heater | TD | Discharge temp. sensor |
| SV1 | Unloading valve | TE(1) | Defrost temp sensor |
| SV2 | Injection valve | TC | Coil temp. sensor |
| 4WV | 4 way valve | TS | Suction temp. sensor |
| CA | Motor capacitor | TA | Ambient temp. sensor |
| ACFAN1 | AC fan motor | EEV | Electronic expansion valve |
| LED1-4 | Lights | LD1-3 | Digital display tubes |
| SW1-4 | Button | SW01,02 | Rotary switch |
| BM1,2 | DIP switch | Tfin | IPM temperature sensor |
| | | PC | Monitor |





AWAU-YCV125-H11 AWAU-YCV150-H11





Please power off firstly for about 10 minutes before checking control box, and make sure the voltage between P and N below 20V.

[NOTES]

•Forbid connecting the power wire to the "P" and "Q", otherwise the control board will be damaged.

- Please check the power firstly before test, and make sure the crankcase heater powering on for 12 hours at least to protecting compressor.
- •The switch BM1-1 is used for locking the indoor units number, the initial situation is "OFF". After power on, the display board will display 【U**】, "**" indicates the number of indoor units that the outdoor unit can communicate with. If it can match the actual number of indoor units, please change "OFF" to "ON", or else fix the communication problem firstly.

| Def. | Display | Indication |
|--------------------------|---------|--------------------------------------|
| Indoor units quantity | U** | **:NUM of the connected indoor units |
| Outdoor | 3.0P | Capability:YCV080 |
| unit | 6.0P | Capability:YCV125/150 |
| capability | 7.0P | Capability:YCV180 |
| Power | 220 | Single phase power type |
| type | 380 | Three phase power type |

[BM Indication]

| BM | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | Capability. | O:OFF |
|-----|-----|-----|-----|-----|-----|----------|----------|-----|-------------|---------|
| BM1 | - | 0 | 1 | 1 | 0 | 0 | 0 | 0 | | 1:0N |
| DMO | 0 | 1 | 0 | 1 | _ | <u>م</u> | <u> </u> | | YCV125/150 | -:FIELD |
| BM2 | 0 | 1 | 1 | 0 | | | | | YCV180 | SET |

Wire Colour:

B:Black

Y:Yellow

W:White BL:Blue

[Symbol Signification]

| - , | 5 | | |
|--------|-------------------|---------|----------------------------|
| Symbol | Signification | Symbol | Signification |
| ACL | Live Wire | HPS | High pressure switch |
| ACN | Neutral Wire | LPS | Low pressure switch |
| HEATER | Compressor heater | TD | Discharge temp. sensor |
| SV1 | Unloading valve | TE(1) | Defrost temp sensor |
| SV2 | Injection valve | TC | Coil temp. sensor |
| 4WV | 4 way valve | TS | Suction temp. sensor |
| CA | Motor capacitor | TA | Ambient temp. sensor |
| DCFAN1 | Upper fan motor | EEV | Electronic expansion valve |
| DCFAN2 | Lower fan motor | LD1-3 | Digital display tubes |
| LED1-4 | Lights | SW01,02 | Rotary switch |
| SW1-4 | Button | Tfin | IPM temperature sensor |
| BM1,2 | DIP switch | PC | Monitor |





AWAU-YCV150-H13 AWAU-YCV180-H13



| fix the communication problem firstly. | | | | | |
|--|---------|---------------------------------------|--|--|--|
| Def. | Display | Indication | | | |
| Indoor units | ** | **·NI IM of the connected indoor unit | | | |

| Indoor units quantity | U** | **:NUM of the connected indoor units |
|--------------------------|------|--------------------------------------|
| Outdoor | 3.0P | Capability:YCV080 |
| unit | 6.0P | Capability:YCV125/150 |
| capability | 7.0P | Capability:YCV180 |
| Power | 220 | Single phase power type |
| type | 380 | Three phase power type |
| | | |

| n, | Symbol | Signification | Symbol | Signification |
|--------|--------|-------------------|---------|----------------------------|
| | ACL | Live Wire | HPS | High pressure switch |
| n | ACN | Neutral Wire | LPS | Low pressure switch |
| r M | HEATER | Compressor heater | TD | Discharge temp. sensor |
| e E | SV1 | Unloading valve | TE(1) | Defrost temp sensor |
| | SV2 | Injection valve | TC | Coil temp. sensor |
| | 4WV | 4 way valve | TS | Suction temp. sensor |
| | CA | Motor capacitor | TA | Ambient temp. sensor |
| | DCFAN1 | Upper fan motor | EEV | Electronic expansion valve |
| | DCFAN2 | Lower fan motor | LD1-3 | Digital display tubes |
| | LED1-4 | Lights | SW01,02 | Rotary switch |
| | SW1-4 | Button | Tfin | IPM temperature sensor |
| | BM1,2 | DIP switch | PC | Monitor |

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(1) Calculation method of refrigerating capacity---Refrigerating capacity to be known

=Refrigerating capacity×(A×B×C×D×E) W



C. Fall of refrigerant pipe of indoor and outdoor unit, capacity compensation value of pipe length



D. Capacity modification value under airflow variation rate of indoor unit group (only for duct unit)



E. Capacity compensation suitable for total capability of indoor unit group (cooling)



Total capacity of indoor unit group(%)





(2) Calculation method of heating capacity---Heating capacity to be known = Heating capacity×(A×B×C×D×E×F) W



C. Capacity modification value under airflow variation rate of indoor unit group



D. Fall of refrigerant pipe of indoor and outdoor unit, capacity compensation value of pipe length





120

100 80

> 60 40

> 20

0

Capacity modification value

F. Capacity compensation value for defrost capability of outdoor heat exchanger



(3) Calculation method of refrigerating capacity---Only one indoor unit running Outdoor modified capacity with a single indoor running = outdoor modified capacity * standby indoor nominal capacity (Outdoor modified capacity: heating or cooling capacity after modify item 1 and 2)



AWAU-YCV080-H11





Indoor temperature (°C WB)







AWAU-YCV125-H1 AWAU-YCV150-H11 AWAU-YCV150-H13 AWAU-YCV180-H13

Cooling









(1) Testing illustration



- (2) Testing condition:
- a. Unit running in the nominal condition
- b. Test in the semi-anechoic chamber
- c. Noise level varies from the actual factors such as room structure, etc.
- (3) Octave band level





AWAU-YCV125-H11 AWAU-YCV150-H11 Octave band sound pressure level $\mathrm{dB}(\mathrm{A})$ 70 60 50 30 20 audible 10 63 250 500 1000 2000 8000 125 4000 Octave band center frequency(Hz)





9.1 Safety

The outdoor uint adopts "simultaneous control" type, all indoors should be heating or cooling simultaneously.

To protect compressor, before startup, the unit should be electrified for over 12 hours. If the unit is not used for a long time, please cut off the power to save energy, or the unit will consume the power.

∆WARNING

- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.
- Keep the appliance and its cord out of reach of children less than 8 years.
- If the air conditioner is transferred to the others, this manual should be transferred together.
- Before installation, please read "Safety precaution" carefully to confirm the correct installation.
- The mentioned precaution includes "AWARNING" and "ACAUTION". The precaution caused death or heavy injury for faulty installation will be listed in "AWARNING". Even the cautions listed in "ACAUTION" also may cause serious accident. So both of them are related to the safety, and should be executed severely.
- After installation, perform a trial and confirm everything normal, then introduce the operation manual to the user. Besides, put the manual to the user and ask them to preserve it carefully.

∆WARNING

- The installation or the maintenance should be performed by the authorized agency. Or the non-specialized operation will cause water leakage, electric shock or fire etc accidents.
- The installation should be executed as per the manual, or the faulty installation will cause water leakage, electric shock or fire etc accidents.
- Please install the unit at the space which can bear the weight. Or the unit will drop down to cause the human injury.
- The installation should defend against the typhoon, and the earthquake etc. Abnormal installation will cause the unit fall down.
- Use the correct cable and make reliable earthing. Fix the terminal firmly and the loose connection will cause heating or fire etc accident.
- The wiring should be in shape and can not be raised. Be earthed firmly and can not be clipped by the electric box cover or the other plate. The incorrect installation will cause heating or fire.
- When setting or transferring the unit, there should not be other air into the refrigerant system except for R410A. The gas mixture will cause the abnormal high pressure which will cause break or human injury etc accidents.
- When installation, please use the accessories with the unit or the special parts, or it will cause water leakage, electric shock, fire, refrigerant leakage etc accidents.
- Don't lead the water drainage pipe into the drainage groove with the poisonous gas, such as sulphur. Or the poisonous gas will enter indoor.
- In installation or after installation, please confirm if there is refrigerant leakage, please take measures for ventilation. The refrigerant will cause poisonous gas as meeting fire.
- Don't install the unit at the place where there may be flammable gas leakage. In case the gas leaks and gather around the unit, it will cause fire.
- The drainage pipe should be installed as per the manual to confirm the fluent drainage. Also take measures for heat insulation against dew drop. Incorrect water pipe installation will cause water leakage even and make the things wet.





- For the liquid pipe and the gas pipe, take measures for heat insulation too. If there is no heat insulation, the dew drop will wet the things.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- · Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.
- Keep the appliance and its cord out of reach of children less than 8 years.

∆CAUTION

- Execute earthing for the unit. But the earthing wire can not be connected to the gas pipe, water pipe, lightening rod or the telephone earthing wire. Improper earthing will cause electric shock.
- Don't install the unit at the place where leaks the flammable gas. Or it will cause fire.
- Execute the water drainage pipe according to the manual, improper installation will cause water leakage to wet the family things.
- The outdoor fan can not face to the flower or the other vegetable, or the blowing gas will make the flower dried up.
- Please ensure the maintenance room, if not, it will cause the maintenance person damaged.
- When installing the unit on the roof or the other high place, to prevent the person falling down, please set the fixed ladder and the railing at the passage.
- Use the two-end spanner, and fasten the nut at proper torque. Don't fasten the nut excessively against the flared section broken. Or it will cause refrigerant leakage and lack of oxygen.
- Take measures for heat insulation to the refrigerant pipe, or there will be water leakage or dew drop to wet the family things.
- After finishing the refrigerant pipe, make leakage test by charging the nitrogen. In case the refrigerant leaks in a small room and exceeds the limited concentration, it will cause lack of oxygen.
- Don't use the other refrigerant except for R410A. The R410A pressure is 1.6 times higher than R22 pressure. The refrigerant R410A tank is marked with pink sign.
- Against charging different refrigerant, we changed the stop valve diameter of the R410A unit. To enhance the compression consistence, we also changed the flared pipe dimension. Prepare the R410A specially tools according to the below table.

| | R-410A specified tools | Remarks |
|---|---|---|
| 1 | Gauge manifold | Range: HP > 4.5MPa, LP > 2MPa |
| 2 | Charge hose | Pressure: HP: 5.3MPa, LP: 3.5MPa |
| 3 | Electronic balance for charging R410A | Can not use the measurable charging tank |
| 4 | Torque spanner | |
| 5 | Flare tool | |
| 6 | Copper pipe gauge for adjusting projecting margin | |
| 7 | Vacuum pump adapter | Must be with reverse stop valve |
| 8 | Leakage detector | Can not use freon leakage detector, but the He detector |

• When charging refrigerant, the refrigerant must be taken out as liquid state from the tank.

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9.2 Installation instruction

In installation, please check specially the below items:

- If the connected units quantity and the total capacity is in the allowable range?
- If the refrigerant pipe length is in the limited range?
- If the pipe size is proper? And if the pipe is installed horizontally?
- If the branch pipe is installed horizontally or vertically?
- If the additional refrigerant is counted correctly and weighed by the standard balance?
- If there is refrigerant leakage?
- If all the indoor power supplies can be on/off simultaneously?
- If the power voltage is in compliance with the data marked on the rating label?
- · If the address of indoors has been set?

(1) Before installation

1) Before installation, check if the model, power supply, pipe, wires and parts purchased respectively are correct. 2) Check if the indoors and outdoors can be combined as the following.

| | Outdoor | Indoor | | | |
|-----------------|------------------|------------|------------------------------|--|--|
| Capacity (100w) | Combination type | Indoor qty | Total indoor capacity (100w) | | |
| 80 | Single | 5 | 40-104 | | |
| 150 | Single | 8 | 75-195 | | |
| 180 | Single | 9 | 90-234 | | |

Notice:

Total capacities of indoor units being used $\leq 100\%$ of rated capacities of outdoor unit.

| indoor capacity (100W) | | | |
|------------------------|------------------------------|------------------------|--|
| 22 | | | |
| 28 | total indoor capacity (100W) | branch pipe (optional) | |
| 36 | | | |
| 40 | | | |
| 45 | less than 335 | TAU335 | |
| 56 | | | |
| 71 | | <u> </u> | |

(2) Installation place selection







Note:

- 1. In snowy area, install the unit under the bracket or the snow-proof cover against the accumulative snow on the unit.
- 2. Do not install the unit at the place where the flammable gas will leak.
- 3. Install the unit at the strong enough place.
- 4. Install the unit at the flat place.
- 5. When being installed at the place with strong wind, set the air outlet of the unit and the wind direction vertical. Also fix the unit with the screw.
- 6. When opening the electric box cover for maintenance, please fix the cover with screw firmly.

(3) Transportation

- In transportation, please don't dismantle the packaging, and move the unit to the installation location as closely as possible.
- If the packaging must be dismantled, hang up the unit with rope against damage.
- Don't hang the unit only at two points. When hanging the unit, don't sit on the unit. The unit should be upright.
- When removing the unit with the forklift, put the fork into the special hole at bottom of the unit.
- When being hanged, the rope should be 4 pieces of steel cable with over 6mm diameter.
- Put the cushion at the contact section between steel cable and the unit against the distortion or damage.

A. Refrigerant pipe connection

Pipe connection method:

- To ensure the efficiency, the pipe should be as short as possible.
- Daub the refrigerant oil on the connector and the flare nut.
- When bending the pipe, the bending semi-diameter should be as large as possible against the pipe being broken or bent.
- When connecting the pipe, aim at the center to thread the nut by hand and tighten it with the double spanners.
- Don't let the impurity such as sand, water etc into the pipe.

• Cautions in piping installation:

- When welding the connector with hard solder, charge nitrogen into the pipe against oxidation. Or the oxygen film in the pipe will clog the capillary and the expansion valve, even cause the deathy accident.
- The refrigerant pipe should be clean. If the water and the other impurity enter the pipe, charge the nitrogen to clean the pipe. The nitrogen should flow under the pressure of about 0.5Mpa and when charging the nitrogen, stop up the end of the pipe by hand to enhance the pressure in the pipe, then loose the hand (meanwhile stop up the other end).
- The piping installation should be executed after the stop valves are closed.
- Before welding the valve and the pipes, use the wet cloth to cool down the valve and the pipes.
- When the connection pipe and the branch pipe need to be cut down, please use the special shears and cannot use the saw.

When fastening and loosing the nut, operate with double spanners, because only one spanner cannot execute firmly.



If threading the nut as not aiming at the center, the screw thread will be damaged, further it will cause leakage.





Pipe material and specs selection

 Please select the refrigerant pipe of the below material. Material: the phosphoric oxidize seamless copper pipe, model: C1220T-1/2H (diameter is over 19.05); C1220T-0(diameter is below 15.88).

2. Thickness and specs:

Confirm the pipe thickness and specs according to the pipe selection method(the unit is with R410A, if the pipe over 19.05 is 0-type, the pressure preservation will be bad, thus it must be 1/2H type and over the min. thickness.

- 3. The branch pipe must be from Airwell.
- 4. When installing the stop valve, refer to the relative operation instruction.
- 5. The pipe installation should be in the allowable range.
- 6. The installation of branch pipe and gather pipe should be performed according to the relative manual.

Pipe specification:



1. Pipe "a" diameter (between indoor and branch pipe) (depends on indoor pipe) Please refer to the indoor air conditioner manual.

2. Pipe "b" diameter (between branch pipes)

| Total indoor capacity after the branch pipe (x100W) | Gas pipe (mm) | Liquid pipe (mm) |
|---|---------------|------------------|
| X<112 | Ø15.88 | Ø9.52 |
| 112≤X< 234 | Ø19.05 | Ø9.52 |

3. Pipe "c" diameter (outdoor pipe diameter)

| Outdoor capacity(100W) | Gas pipe (mm) | Liquid pipe (mm) |
|------------------------|---------------|------------------|
| 80 | Ø15.88 | Ø9.52 |
| 150 | Ø19.05 | Ø9.52 |
| 180 | Ø19.05 | Ø9.52 |

Note:

When the distance from outdoor to the longest indoor is over 30m, the main pipe should be the enlarged diameter.

Copper pipe selection:

| hardness | | softi | ness | | Half-harc | Iness | | |
|---------------------|-------|-------|-------|--------|-----------|--------|--------|--------|
| Outer diameter (mm) | Ø6.35 | Ø9.52 | Ø12.7 | Ø15.88 | Ø19.05 | Ø22.22 | Ø25.24 | Ø28.58 |
| Min. thickness (mm) | 0.8 | 0.8 | 1.0 | 1.0 | 1.0 | 1.1 | 1.2 | 1.4 |

Note: If the copper pipe with outer diameter 19.05 is coil pipe, the thickness should be over 1.1.





Long pipe and high drop





AWAU-YCV080-H11 type: Maximal length and drop height permissible of refrigerant piping

| | | | Permissible value | Piping part |
|--------|---|---------------------|-----------------------|---------------|
| | Total length of piping (actual ler | 100m | L1+L2+L3+L4+a+b+c+d+e | |
| Piping | Longest piping L | Actual length | 50m | L1+L2+L3+L4+e |
| length | Piping length of indoor unit which is furthest piping L (*) | to the first branch | 30m | L2+L3+L4+e |
| Duran | Drop height between indoor and outdoor unit | Up outdoor | 30m | |
| Drop | H Under outdoor | | 20m | |
| Teight | Drop height between indoor un | 10m | | |

AWAU-YCV125/150/180-H13type: Maximal length and drop height permissible of refrigerant piping

| | | | Permissible value | Piping part |
|---------|---|---------------------|-----------------------|---------------|
| | Total length of piping (actual ler | 150m | L1+L2+L3+L4+a+b+c+d+e | |
| Piping | Longest piping L | Actual length | 70m | L1+L2+L3+L4+e |
| length | Piping length of indoor unit which is furthest piping L (*) | to the first branch | 40m | L2+L3+L4+e |
| Dueu | Drop height between indoor and outdoor unit | Up outdoor | 30m | |
| Drop H | Н | Under outdoor | 20m | |
| lieigin | Drop height between indoor units h | | 10m | |

Unit pipe spec and connection method (unit: mm)

A. Outdoor unit

| Madal | Gas | pipe side | Liquid pipe side | | |
|-------------------------|---------------|---------------------------------|------------------|-------------------|--|
| Model | Diameter (mm) | Diameter (mm) Connecting method | | Connecting method | |
| AWAU- YCV080-H11 | Ø15.88 | | Ø9.52 | | |
| AWAU- YCV125/150-H11 | Ø19.05 | Elorad igint | Ø9.52 | Elorad isint | |
| AWAU- YCV150-H13 | Ø19.05 | Flared joint | Ø9.52 | Flared joint | |
| AWAU- YCV180-H13 | Ø19.05 | | Ø9.52 | | |





B. Indoor unit

| Model Capacity | Gas | pipe side | Liquid pipe side | | |
|----------------|---------------|---------------------------------|------------------|-------------------|--|
| | Diameter (mm) | Diameter (mm) Connecting method | | Connecting method | |
| 09 | Ø9.52 | | Ø6.35 | | |
| 12 | Ø12.7 | | Ø6.35 | | |
| 16 | Ø12.7 | Flared joint | Ø6.35 | Flared joint | |
| 18 | Ø12.7 | | Ø6.35 | | |
| 24 | Ø15.88 | | Ø9.52 | | |

C. Pipe spec and the torque

| Diameter (mm) | Thickness (mm) | Torque (N.m) |
|----------------------|---|--|
| Ø6.35 | 0.8 | 16~20 |
| Ø9.52 | 0.8 | 40- 50 |
| Ø12.7 | 1.0 | 40~50 |
| Ø15.88 | 1.0 | 90~120 |
| Ø19.05 | 1.0 | 100~140 |
| Ø22.22 | 1.1 | |
| Ø25.4 | 1.2 | |
| Not less than Ø28.58 | More than 1.4 | |
| | Diameter (mm) Ø6.35 Ø9.52 Ø12.7 Ø15.88 Ø19.05 Ø22.22 Ø25.4 Not less than Ø28.58 | Diameter (mm) Thickness (mm) Ø6.35 0.8 Ø9.52 0.8 Ø12.7 1.0 Ø15.88 1.0 Ø19.05 1.0 Ø22.22 1.1 Ø25.4 1.2 Not less than Ø28.58 More than 1.4 |

Note: If the copper pipe with outer diameter 19.05 is coil pipe, the thickness should be over 1.1.

Branch pipe

Outdoor unit type

Branch pipe selection:

| Total indoor capacity (100W) | Model (optional) |
|------------------------------|------------------|
| Less than 335 | TAU335 |

Note:

- 1. When connecting the pipe and the outdoor, please pay attention to the outdoor pipe dimension.
- 2. When adjusting the diameter among pipes and among the units, please must execute at the branch pipe side.
- 3. When welding with hard solder, please must blow nitrogen. If not, a number of oxide will be produced and cause heavy damage. Besides, to prevent water and dust into the pipe, please make the brim as outer roll.



Cut off pipe with the cutter

П Cut off at the middle





Pipe installation

When doing the piping connection, please do the following:

- Please don't let the pipe and the parts in the unit collide each other.
- When connecting the pipes, close the valves fully.
- Protect the pipe end against and water, impurities (welding after being flatted, or being sealed with adhesive tape).
- Bend the pipe as large semi-diameter as possible(over 4 times of the pipe diameter).
- The connection between outdoor liquid pipe and the distributing pipe is flared type. Please expand the pipe with the special tool for R410A after installing the expanding nut. But if the projecting pipe length has been adjusted with the copper pipe gauge, you can use the original tool to expand the pipe.
- Since the unit is with R410A, the expanding oil is ester oil, not the mineral oil.
- When doing the flare connection, please do the following: When connecting the expanding pipe, fasten the pipes with double-spanner. The torque refers to the former info.



- The outdoor gas pipe and the refrigerant distributing pipe, as well the refrigerant distributing pipe and the branch pipe should be welded with hard solder.
- Weld the pipe at the same time charge the nitrogen. Or it will cause a number of impurity (a film of oxidation) to clog the capillary and the expansion valve, further cause the deadly failure.



• Protect the pipe end against the water, impurity into the pipes (welding after being flat, or being sealed with adhesive tape).



• The refrigerant pipe should be clean. The nitrogen should flow under the pressure of about 0.2Mpa and when charging the nitrogen, stop up the end of the pipe by hand to enhance the pressure in the pipe, then loose the hand (meanwhile stop up the other end).



- · When connecting the pipes, close the valves fully.
- When welding the valve and the pipes, use the wet cloth to cool down the valve and the pipes.





B. Leakage test

- 1. The outdoor unit has been executed the leakage test in the factory. After connecting the distributing pipe, execute the leakage test from the outdoor check valve and the indoor. Besides, while testing, the valves should be close.
- 2. Refer to the below figure to charge the nitrogen into the unit to take a test. Never use the chlorine, oxygen, flammable gas in the leakage test. Apply pressure both on the gas pipe and the liquid pipe.
- 3. Apply the pressure step by step to the target pressure.
 - a. Apply the pressure to 0.5MPa for more than 5 minutes, confirm if pressure goes down.
 - b. Apply the pressure to 1.5MPa for more than 5 minutes, confirm if pressure goes down.
 - c. Apply the pressure to the target pressure (4.0MPa), record the temp. and the pressure.
 - d. Leave it at 4.0MPa for over 1 day, if pressure does not go down, the test is passed. Meanwhile, when the temp. changes for 1degree, pressure will change 0.01MPa as well. Correct the pressure.
 - e. After confirmation of a~d, if pressure goes down, there is leakage. Check the brazing position, flared position by laying on the soap. modify the leakage point and take another leakage test.
- 4. After leakage test, must execute the evacuation.



C. Evacuation

Evacute at the check valve of liquid stop valve and both sides of the gas stop valve.

Operation procedure:



Because the unit is with refrigerant R410A, the below issues should be paid attention:

- To prevent the different oil into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
- To prevent the compressor oil into the refrigerant cycle, please use the anti-counter-flow adapter.

D. Check valve operation

Open/close method:

- Take down the valve cap.
- Turn the liquid stop valve and the gas stop valve with hexangular spanner until it stops. If opening the valve strongly, the valve will be damaged.
- Tighten the valve cap.

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Tighten torque as the table below:

| Tighten torque N.m | | | | | |
|--------------------|--------------------|----------------|---------------------------|--|--|
| | Shaft (valve body) | Cap (cover) | T-shape nut (check joint) | | |
| For gas pipe | Less than 7 | Less than 30 | 13 | | |
| For liquid pipe | 7.85 (MAX15.7) | 29.4 (MAX39.2) | 8.8 (MAX14.7) | | |

E. Additional refrigerant charging

Charge the additional refrigerant as liquid state with the gauge.

If the additional refrigerant can not be charged totally when the outdoor stops, charge it at the trial mode.

If the unit runs for a long period in the state of lack of refrigerant, compressor will occur failure.

(the charging must be finished within 30 minutes especially when the unit is running, meanwhile charging the refrigerant).

A. Charging amount when out of factory excludes the refrigerant in the pipe.

B. The unit only is charged the standard volume of refrigerant (distributing pipe length is 0m).

Additional charging amount=actual length of liquid pipe x additional amount per meter liquid pipe

Additional charging amount=L1×0.35+L2×0.25+L3×0.17+L4×0.11+L5×0.054+L6×0.022

L1: total length of 22.22 liquid pipe L2: total length of 19.05 liquid pipe

L3: total length of 15.88 liquid pipe L4: total length of 12.7 liquid pipe

L5: total length of 9.52 liquid pipe L6:total length of 6.35 liquid pipe

C. Refrigerant charging and additional charging

| | | Additiona | Charge when out of factory | | | | |
|-----------------|--------|-----------|----------------------------|-------|-------|-------|----------------------------|
| Model | Ø22.22 | Ø19.05 | Ø15.88 | Ø12.7 | Ø9.52 | Ø6.35 | Charge when out of factory |
| AWAU-YCV080-H11 | | | | | | | |
| AWAU-YCV125-H11 | | | | | | | |
| AWAU-YCV150-H11 | 0.35 | 0.25 | 0.17 | 0.11 | 0.054 | 0.022 | Refer to label |
| AWAU-YCV150-H13 | | | | | | | |
| AWAU-YCV180-H13 | | | | | | | |

Note:

- To prevent the different oil into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
- Mark the refrigerant type in different colour on the tank. R410A is pink.
- Must not use the charging cylinder, because the R410A will change when transferring to the cylinder.
- When charging refrigerant, the refrigerant should be taken out from the tank as liquid state.
- Mark the counted refrigerant volume due to the distributing pipe length on the label.

GWP: 2088

The product contains fluorinated greenhouse gases and its functioning relies upon such gases.

Heat insulation

- · Gas pipe and liquid pipe should be heat insulated separately.
- The material for gas pipe should endure the high temperature over 120°C.That for liquid pipe should be over 70°C.
- The material thickness should be over 10mm, when ambient temp. is 30°C, and the relative humidity is over 80%, the material thickness should be over 15mm.
- He material should cling the pipe closely without gap, then be wrapped with adhesive tape. The connection wire can not be put together with the heat insulation material and should be far at least 20cm.



Fix the refrigerant pipe

- In operation, the pipe will vibrate and expand or shrink. If not being fixed, the refrigerant will focus on one part to cause the broken pipe.
- To prevent the central stress, fix the pipe for every 2-3m.





Communication wiring figure



The master outdoor and all indoor units are in parallel through 2 non-polar wires.

There are three connecting ways between wired control and indoor units:

A. One wired controller controls multiple units, as shown in the above figure, (1-3 indoor units). The indoor unit 3 is the wired control master unit (directly connected to the indoor unit of wired controller) and others are the wired control slave units. indoor unit 2 is DC fan motor models, indoor unit 1 is the AC fan motor models. The wired controller is connected with the master unit and DC fan motor models through three lines with polarity. Other indoor units and the master unit are connected via two lines with polarity. SW01 on the main unit is set to 0 while SW01 on other slave units are set to 1, 2, 3 and so on in turn. (Please refer to the dip switch setting)

B. One wired controller controls one indoor unit, as shown in the above figure (indoor unit 4-5). The indoor unit and the wired controller are connected via three lines with polarity.

C. Two wired controllers control one indoor unit, as shown in the figure (indoor unit 6). Either of the wired controllers can be set to be the master wired control while the other is set to be the slave wired controller. The master wired controller, slave wired controller and indoor units are connected via three lines with polarity.





Power wiring figure

Г



Indoor and outdoor use their individual power source. All indoors use one power source. Must install the leakage breaker and the over current breaker, or electric shock will occur.

| Outdoo | Jutdoor power source and power cable | | | | | | |
|-----------|--------------------------------------|-----------------|--|---------------------------|---|------------------|-------|
| \square | Item | | | | Rated current of residual | Ground wire | |
| Model | | Power source | Power cable section (mm ²) | Circuit breaker (A) | circuit breaker (A) Ground fault interrupter (mA) response time (S) | Section (mm²) | Screw |
| 5 | AWAU-YCV080-H11 | 1 D H | 6 | 25 | 25A 30mA below 0.1S | 6 | M5 |
| Bwod | AWAU- YCV125/150-H11 | 220-230V~, 50Hz | 16 | 50 | 50A 30mA below 0.1S | 16 | M5 |
| vidual | AWAU- YCV150-H13 | 3N~, | 4 | 20 | 20A 30mA below 0.1S | 4 | M5 |
| Indi | AWAU- YCV180-H13 | 380-400V, 50Hz | 4 | 20 | 20A 30mA below 0.1S | 4 | M5 |

· Power cable must be fixed firmly.

· Each outdoor must be earthed well.

· When power cable exceeds the range, thicken it appropriately.





Indoor power source and communication wiring

| Item | | | Rated current | Rated current of residual | Communicatio | on wire section |
|--------------------------------|--|--------------------|----------------------------------|--|-------------------------|------------------------|
| Indoor total current (A) | Power cable section (mm ²) | Wire length (m) | of overcurrent breaker (A) | circuit breaker(A) Ground fault interrupter(mA) response time(S) | Outdoor/indoor (mm²) | Indoor/indoor (mm²) |
| <10 | 2 | 23 | 20 | 20A, 30mA, below 0.1s | | |
| ≥10 and <15 | 3.5 | 24 | 30 | 30A, 30mA, below 0.1s | 2-core × (0. | 75-2.0mm²) |
| ≥15 and <22 | 5.5 | 27 | 40 | 40A, 30mA, below 0.1s | shielde | ed wire |
| ≥22 and <27 | 10 | 42 | 50 | 50A, 30mA, below 0.1s | | |

- Power cable and communication wire must be fixed firmly.
- Each indoor must be grounded well.
- · When power cable exceeds the range, increase the gauge appropriately.
- Shielded layer of communication wires must be connected together and be earthed at single point.
- The total length of communication wire cannot exceed 1000m.

Communication wire for wired controller

| Wire length(m) | Wire spec |
|----------------|---|
| ≤250 | 0.75mm ² ×(3-core) shielded wire |

- Shielded layer of communication wire must be grounded at one end.
- The total length cannot exceed 250m.




5-minute delay function

• If starting up the unit after being powered off, the compressor will run about 5 minutes later against being damaged.

Cooling/heating operation

• Indoor units can be controlled individually, but cannot run in cool and heat mode at the same time. If the cool mode and the heat mode are existing simultaneously, the unit set latter will be standby, and the unit set earlier will run normally. If the A/C manager sets the unit at cooling or heating mode fixedly, the unit can not run at the other modes.

Heating mode characteristic

• In operation if outdoor temp. arises, indoor fan motor will turn to low speed or stop.

Defrosting in heating mode

• In heating mode, outdoor defrosting will affect the heating efficiency. The unit will defrost for about 2~10 minutes automatically, at this time, the condensate will flow from outdoor, also in defrosting, the vapour will appear at outdoor, which is normal. Indoor motor will run at low speed or stop, and outdoor motor will stop.

The unit operation condition

- To use the unit properly, please operate the unit under the allowed condition range. If operating beyond the range, the protection device will act.
- The relative humidity should be lower than 80%. If the unit runs at the humidity over 80% for a long period, the dew on the unit will drop down and the vapour will be blowed from air outlet.

Protection device (such as high pressure switch)

- High pressure switch is the device which can stop the unit automatically when the unit runs abnormally.
- When the high pressure switch acts, the cooling/heating mode will stop but the running LED on wired controller will be light still. The wired controller will display failure code.
- · When the following cases occur, the protection device will act:
- In cooling mode, air outlet and air inlet of outdoor are clogged.
- In heating mode, indoor filter is stacked with duct; indoor air outlet is clogged.
- When protection device acts, please cut off the power source and re-start up after eliminating the trouble.

When power failure

- When power is failure in running, all the operations will stop.
- After being electrified again, if with re-start up function, the unit can resume to the state before power off automatically; if without re-start up function, the unit needs to be switched on again.
- When abnormal occurs in running because of the thunder, the lightning, the interference of car or radio, etc, please cut off the power source, after eliminating the failure, press "ON/OFF" button to start up the unit.

Heating capacity

• The heating mode adopts the heat pump type that absorbs outdoor heat energy and releases into indoor. So if outdoor temperature goes down, the heating capacity will decrease.

System marks

 On the condition that multi Outdoor systems are installed, in order to confirm the relationship between outdoor and indoor, please make marks on outdoor electric control box cover to indicate the connected indoor unit. As the below figure:







Trial operation

• Before trial operation:

Before being electrified, measure the resistor between power terminal block (live wire and neutral wire) and the earthed point with a multimeter, and check if it is over 1M * . If not, the unit can not operate. To protect compressor, electrify the outdoor unit for at least 12 hours before the unit runs. If the crankcase heater is not electrified for 6 hours, the compressor will not work. Confirm the compressor bottom getting hot. Except for the condition that there is only one master unit connected (no slave unit), under the other conditions, open fully the outdoor operating valves (gas side, liquid side). If operating the unit without opening the valves, compressor failure will occur. Confirm all indoor units being electrified. If not, water leakage will occur. Measure the system pressure with pressure gauge, at the same time, operate the unit.

Trial operation

In trial operation, refer to the information of performance section. When the unit can not start up at the room temperature, make trial operation for outdoor.





PCB code: 0151800146D (Outdoor model: AWAU-YCV080-H11)



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PCB code: 0151800146EA (Outdoor model: AWAU-YCV125-H11, AWAU-YCV150-H11, AWAU-YCV150-H13, AWAU-YCV180-H13)







Electric wiring and the application

Outdoor unit PCB dipswitch setting (attention the different PCB version.)

• Defined principles of dial switch:

BM1 puts emphasis on setting or debugging during the project, while BM2 during factory production.

① BM1 introduction

| | | [1] | Lock indoor quantity | |
|-------|--------------------------------|-----------|--|--|
| BM1_1 | Lock indoor quantity | OFF | Begin to search indoor | |
| | | <u>ON</u> | Stop searching indoor and lock quantity | |
| | | [2] | Reserved | |
| BM1_2 | Reserved | OFF | Reserved (default) | |
| | | <u>ON</u> | Reserved | |
| | | [3] | Fan selection | |
| BM1_3 | Fan selection | OFF | All AC | |
| | | <u>ON</u> | All DC | |
| | | [4] | Priority selection for energy saving /effect | |
| BM1_4 | effect | OFF | Energy saving priority | |
| | | <u>ON</u> | Effect priority | |
| | Indoor ON / OFF simultaneous | [5] | Indoor ON / OFF simultaneous control | |
| BM1_5 | | OFF | Every indoor unit can be controlled seperately | |
| | | <u>ON</u> | All the indoor units will simultaneous ON or OFF | |
| | | [6] | Defrosting condition selection | |
| BM1_6 | Defrosting condition selection | OFF | Not easy to frost area(default) | |
| | | <u>ON</u> | Easy to frost area | |
| | | [7] | Defrosting level | |
| BM1_7 | Defrosting level | OFF | Ordinary defrosting (default) | |
| | | <u>ON</u> | Strengthen defrosting (increase the defrositng time) | |
| | | [8] | Silent operation selection | |
| BM1_8 | Silent operation selection | OFF | Without silent operation(default) | |
| | | <u>ON</u> | Silent operation | |





② BM2 introduction

| | | [1] | Cooling | Cooling only or heat pump | | | |
|---------|----------------------------------|-----------|-----------|--|--------------------------------------|--|--|
| BM2_1 | Cooling only or heat pump | OFF | Heat p | ump(det | fault) | | |
| | | <u>ON</u> | Cooling | Cooling only | | | |
| | | [2] | [3] | [4] | Outdoor horse power selection | | |
| BM2_2 | Outdoor borgo power coloction | OFF | OFF | OFF | YCV080 | | |
| $BM2_4$ | | <u>ON</u> | OFF | <u>ON</u> | YCV125/150 | | |
| | | <u>ON</u> | <u>ON</u> | OFF | YCV180 | | |
| | | [5] | Power | source | selected | | |
| BM2_5 | Power source selected | OFF | Single- | Single-phase | | | |
| | | <u>ON</u> | Three- | Three-phase | | | |
| | Communication protocol selection | [6] | Commu | Communication protocol selection | | | |
| BM2_6 | | OFF | New pr | New protocol (default) | | | |
| | | <u>ON</u> | Old pro | Old protocol | | | |
| | | [7] | [8] | Running mode preference | | | |
| | | OFF | OFF | F First on indoor unit priority (default) | | | |
| | | OFF | <u>ON</u> | Last on indoor unit priority | | | |
| | | | | Cooling priority, any one indoor unit runs | | | |
| BM2_7 | | ON | OFF | cooling mode, the outdoor unit will run in | | | |
| BM2_8 | | | | cooling mode, the indoor units running in | | | |
| | | | | Heating | node will stop | | |
| | | | | heating | a mode, the outdoor unit will run in | | |
| | | <u>ON</u> | <u> </u> | heating mode, the indoor units running in | | | |
| | | | | cooling mode will stop | | | |

Note:

Either indoor unit unlocked or the locked quantity different with actual connecting number, it cannot run.

Bridge instruction

CJ1:

Short it before power ON-- PCB check its function (used for factory production. Short it after power ON-- time short function, 60 seconds become to 1 second. CJ2: Reserved

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Main function instruction:

By setting the rotary switch, the digital tube will display the outdoor and indoor unit parameters, the data is inform of decimal integer. During the process of installation, adjustion and maintenance, the whole system's operating parameters can be tested conveniently which can help to check and solve problems quickly and correctly.

| SW01 | SW02 | Display of numeral pipe light with seven segments | | | | | |
|------|------|--|--|--|--|--|--|
| | 0 | Error code display(Before indoor unit locked, the following sequences flash:"U"+indoor num., e.g.: | | | | | |
| | | horse power outdoor unit; "220" or "380" means single-phase power source or three-phase power source.) | | | | | |
| | 1 | Operation mode of outdoor units(Stopping :OFF, Cooling: CCC, Heating: HHH | | | | | |
| | 2 | Program version(one decimal) | | | | | |
| | 3 | E2 version | | | | | |
| | 4 | Target operating frequency of compressor(Press "Start" 5 seconds to enter the manual frequency control, Up / Down to adjust the frequency, press "Stop" 5 seconds to exit manual frequency control; Frequency flashes when manual control, while non-manual control, frequency displays normally) | | | | | |
| | 5 | Actual frequency of compressor | | | | | |
| | 6 | Indoor units num. | | | | | |
| | 7 | Running indoor units num. | | | | | |
| 0 | 8 | Outdoor unit horse power(AU28-3.0P, AU48-6.0P, AU60-7.0P) | | | | | |
| | 9 | Rotating speed of outdoor unit Fan1 (unit: rpm, max:999) | | | | | |
| | A | Rotating speed of outdoor unit Fan2 (unit: rpm, max:999) | | | | | |
| | В | Target indoor unit average temp. sensor TC2(unit:℃) | | | | | |
| | С | Actual indoor unit average temp. sensor TC2(unit:℃) | | | | | |
| | D | Target overheat value of PMW when heating(unit:℃) | | | | | |
| | E | Special operating mode of outdoor unit: First num.: power source type(0-single phase,1-three phase) Second num.: silent operation (0-off, 1-on) Third num.: gas recovery operating(0-off, 1-on) ("101" means the outdoor unit has three phrase power source, silent operation off and gas recovery on) | | | | | |
| | F | Forced fan operation, when unforced display "Fan" (Press "Start" 5 seconds to enter manual fan control, Up / Down to adjust fan speed, press "Stop" 5 seconds to exit manual fan control), when forced flashes "0-15". This function can't be affected by the failures of outdoor unit. | | | | | |





| SW01 | SW02 | Display of numeral pipe light with seven segments |
|------|------|---|
| | 0 | Discharge temp. sensor Td (unit:℃) |
| | 1 | Outdoor unit ambient temp. sensor TA (unit: °C) |
| | 2 | Suction temp. sensor Ts (unit: $^{\circ}$) |
| | 3 | Defrost temp. sensor Te (unit:℃) |
| | 7 | Outdoor unit PMV opening |
| | | Valve state |
| | | First num.:4WV(0-off, 1-on) |
| | 8 | Second num.:SV1(0-off, 1-on) |
| | | Inira num.: SV2(U-orr, I-on) (101 means (IWV) on SV1 off SV2 on) |
| | | First num : High prossure switch HPS(0 off 1 on) |
| 1 | - | Second num.: Low pressure switch LPS(0-off, 1-on) |
| | 9 | Third num.: Heating belt(0-off, 1-on) |
| | | (101 means HPS on, LPS off and heating belt on) |
| | А | Module temp. sensor Tfin(unit: °C) |
| | В | Compressor current(unit: A, one decimal) |
| | С | Coil temp. sensor Tc(unit:℃) |
| | D | Module DC voltage(unit: V) |
| | _ | Air conditioner current value CT(unit: A) |
| | E | Display "CCC" alternately in forced cooling mode.(Pressing "Start" 5 seconds, all indoor units enter cooling mode, they exit when pressing "Storp" 5 seconds) |
| | | Display "HHH" in forced beating mode (Pressing "Start" 5 seconds, all indoor units enter beating mode |
| | F | they exit when pressing "Stop" 5 seconds), display "" when unforced |
| 2 | 0-F | Display indoor unit program version when communication is normal or else display "" |
| 3 | 0-F | Indoor unit types(0:Ordinary indoor uint,1:Wall mounted,2:Fresh air uint,3:Heat reclaim ventalation,4- 7:Ordinary indoor unit) |
| 4 | 0-F | Display failure code when suffers failure ,or else display "" |
| 5 | 0-F | Indoor unit horse power(one decimal) |
| | | First and second num.: Current operation mode of the indoor unit(00:Off,01:Fan, 02:Cooling,03: |
| 6 | 0-F | Dehumidification,04:Heating) |
| | • | Third num.: Capacity requirement of the outdoor unit(0-no,1-yes)(e.g.:"021" means cooling and capacity |
| 7 | 0 5 | Indeer unit DMV energing (unit) and means nearing and no capacity requirement of the outdoor unit) |
| - 1 | U-F | Indoor unit PMV opening(unit.pis,max.999) |
| 8 | 0-F | First num · Floater switch(0-off 1-on). Second num · Pump(0-off 1-on) Third num · |
| Ŭ | 0. | Electric heater:(0-off,1-on)("110" means floater on, pump on and electric heater off) |
| 9 | 0-F | Indoor unit: Ambient temp. sensor TA(unit: °C) |
| A | 0-F | Indoor unit: Gas pipe temp. sensor TC1(unit:℃) |
| В | 0-F | Indoor unit: Liquid pipe temp. sensor TC2(unit: °C) |
| С | 0-F | Indoor unit: Fan speed(0-stop,1-low,2-middle,3-high) |
| F | 0-F | Display "CCC" in forced cooling mode.(Pressing "Start" 5 seconds, indoor units enter cooling mode, they |
| | | exit when pressing "Stop" 5 seconds),Display "" without forced. |
| F | 0-F | Display "HHH" in forced heating mode.(Pressing "Start" 5 seconds, indoor units enter heating mode, they exit when pressing "Stop" 5 seconds),Display "" without forced. |





15.1 Compressor startup control

On startup, inverter compressor will keep for 3 min at 45rps (when Ta<43°C) or 3 min at 40rps (when Ta>=43°C). in cooling mode, meet running 3min and Td≥85°C(or max. running time is 5min),quite the startup control;

in heating mode, meet running 3min and Ts-Tc≥5°C(or Tc or Ts<-18°C, or max. running time is 5min), quite the startup control;

During startup, the high pressure, high exhaust protection and current protection is priority and the low exhaust up frequency protection is shielded.

After startup control, system according to the TC2 value Thermo ON indoor liquid pipe temperature as the target to control the compressor frequency.

15.1.1 In cooling, the compressor frequency control as below:

| Mode | Energy-saving mode | Effect priority mode | Outdoor ambient temperature |
|--------------------|--------------------|----------------------|------------------------------------|
| Target average TC2 | R | R | Tao≤12°C |
| Target average TC2 | 9 | 8 | 12°C <tao<40°c< td=""></tao<40°c<> |
| Target average TC2 | Set value+2 | Set value +2 | Tao≥40°C |

Revalue set Tao<-5°C, Target average TC2:0°C; -5°C≤Tao<12°C, Target average TC2 is the set value (when 12°C<Tao<40°C) and slope value of 0.

15.1.2 In heating, the compressor frequency control as below:

| Mode | Energy-saving mode | Effect priority mode | Outdoor ambient temperature |
|--------------------|--------------------|----------------------|-----------------------------|
| Target average TC2 | Set | value+2 | Tao≥15°C |
| Target average TC2 | 42 | 45 | Tao≥-5°C |
| Target average TC2 | Set | value+2 | Tao<-5°C |

In order to improve the effect of indoor unit, reach the purpose of rapid cooling/heating, make the following control:

1) In cooling, when outdoor ambient temperature above 25 °C, the first 60 min, TC2 drops 1°C, returned to normal after 60 min;

2) In heating, when outdoor ambient temperature below 15 °C, the first 60 min, TC2 rise 1°C, returned to normal after 60 min;

15.2 Outdoor fan motor control

15.2.1 In cooling mode

According to outdoor temperature of Tc to control the outdoor unit , Tc refers to the higher value of Te and Tc. when Tc < 10 °C, the fan will stop after running in the low speed for 1 minutes; when 10 °C≤ Tc < 25 °C, fan reduce the speed per 1 class /45s drop 1 class speed; when $25^{\circ}C\leq Tc<35^{\circ}C$, fan keeps the current speed; when $35^{\circ}C\leq Tc<53^{\circ}C$, fan rise the speed per 1 class /45 s rise 1 class speed; when $Tc\geq 53^{\circ}C$, fan will running with the highest speed.

15.2.2 In heating mode

During the four-way valve revering, the fan motor stop. Four-way valve has the reversing, after the compressor start, in 1 minutes the wind speed based on ambient temperature (including defrosting control and the end of the heating oil return air discharge operation stages), according to the Te temperature automatic control after 1 minute, Te refers to the higher value of Te and Tc.

When Te> 21°C, Fan reduce the speed per 1 class /45 s until to stop; when 16°C<Te≤21°C, Fan reduce the speed per 1 class /45 s to drop 1 class ; when 6°C<Te≤16°C, fan keeps the current speed; when 1°C<Te≤6°C, fan rise the speed per 1 class /45 s rise 1 class speed; when Te≤1°C, fan will running with the highest speed.

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15.3 Defrosting control

In order to have the effect heating operation, need defrosting control.

15.3.1 Entering condition:



15.3.2 Defrosting control

During defrosting, four-way valve power off, outdoor fan stop, indoor fan stop, outdoor PMV open to 470pls.

15.3.3 Quit defrosting







15.4 Oil return control





Note: load rate=∑indoor HP(Thermo ON) / ∑indoor HP*100%

15.4.2 Oil return control

During Oil return, the compressor according to the 75% of maximum frequency control, the outdoor PMV opening angle is 470 PLS, the Thermo ON indoor PMV opening angle is 250 PLS, the Thermo OFF indoor PMV opening angle is 125 PLS. When Td > 95 °C, the indoor PMV opening angle increased 10%, max. time is 2. When Td < 90 °C, returns to the usually opening.

15.4.3 Oil return guit condition:







Inverter outdoor unit failure code

| Digital tube indication on master unit | Indication on wired controller (hex) | Failure code definition | Failure description | Remarks |
|--|--|--|---|---------------------------------------|
| 20 | 14 | Defrosting temp. sensor Te failure | AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in cooling mode, if the sensor | Resumable |
| 20 | 14 | Defrosting temp. sensor Tc failure | is abnormal, the unit does not deal with it, besides, in defrosting and within 3 minutes after defrosting, no alarm | |
| 21 | 15 | Ambient temp. sensor Ta failure | AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in defrosting and within 3 minutes after defrosting, no alarm | Resumable |
| 22 | 16 | Suction temp. sensor Ts failure | AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in defrosting and within 3 minutes after defrosting, no alarm | Resumable |
| 23 | 17 | Discharging temp. sensor Td failure | After compressor is running for 5 minutes, AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in course of startup, defrosting and within 3 minutes after defrosting, no alarm | Resumable |
| 26 | 1A | | For continuous 200 cycles, can not find connected indoors | |
| 26-1 | 1A | Indoor communication | For continuous 300seconds, the searched indoor quantity is less than the set quantity. | Resumable |
| 26-2 | b-1 1A communication 6-2 1A failure 30 1E High pressure awitch HDS failure High pressure | | For continuous 300seconds, the searched indoor quantity is more than the set quantity. | |
| 30 | 1E | High pressure switch HPS failure | If disconnect for 50ms continuously, alarm. If alarm 3 times in an hour, confirm the failure | Once confirmation, un-resumable |
| 33 | 21 | EEPROM failure | re EEPROM failure | |
| 34 | 22 | Discharging temp. too high protection (Td) | Td≥115°C at interval of 25msec for twice continuously, and over the set value, then stop and alarm; 3 minutes later, resume automatically. If it occurs 3 times in an hour, confirm the failure. | Once confirmation, un-resumable |
| 35 | 23 | 4-way valve reversing failure | If the compressor continuously runs 10 minutes without 4-way valve reversing failure, three minutes later, resume automatically. If it occurs 3 times in an hour, confirm the failure. | Once confirmation, un-resumable |
| 43 | 2В | Discharging temp. sensor Td too low protection | In normal operation, if Td <ct+10°c 5<br="" continuous="" for="">minutes, the unit stops and alarms.2 minutes and 50 seconds later, resume automatically. If it occurs 3 times in an hour, confirm the failure. After fixed frequency compressor alarms, inverter compressor will continue to run. If fixed frequency compressor has been locked for 3 times, the unit will stop and alarm.</ct+10°c> | Once confirmation, un-resumable |
| 46 | 2E | Communication with inverter board failure | No communication within 30 seconds continuously | Resumable |
| 49 | 31 | Low pressure switch LPS failure | If disconnect for 50ms continuously,alarm. If alarm 3 times in an hour,confirm the failure | Once confirmation, un-resumable |

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| Digital tube indication on master unit | Indication on wired controller (hex) | Failure code definition | Failure description | Remarks |
|--|---|---|---|--------------------------------|
| 53 | 35 | CT current is too low or current sensor fault | 3 minutes after recovery | 3 times in an hour, confirm |
| 64 | 40 | CT current is too high | CT current exceeds specified value, 3 minutes after recovery | confirmation, un-resumable |
| 71-0 | 47 | Upper DC motor blocked | Running at speed below 20rpm for 30s, or at speed of 70% lower than the target for 2 minutes, 2 minutes and 50 | Once |
| 71-1 | 47 | Lower DC motor blocked | seconds later after stop, resume automatically. It occurs 3 times in an hour, confirm the failure. | un-resumable |
| 81 | 51 | IPM modular temp. too high protection | IPM modular temp.≥85°C | 3 times in an hour, confirm |
| 82 | 52 | Compressor current protection | Compressor current exceeds specified value, 3 minutes after recovery | confirmation, un-resumable |
| 108 | 6C | Transient over current in IPM module rectifier side software | Transient over current in IPM module rectifier side software | 3 times in an hour, confirm |
| 109 | 6D | Current detection circuit abnormality | Current detection circuit abnormality | confirmation, un-resumable |
| 110 | 6E | IPM modular protection (F0) | IPM modular over current, in short circuit, over heat, voltage too low of control circuit. | |
| 111 | 6F | Compressor out of control | In the course of compressor startup or running, the unit can not detect the rotor position, or not connecting compressor. | 0.1 |
| 112 | 70 | Radiator of transducer temp. too high | Radiator temp. too high | failure; once confirmation, |
| 113 | 71 | Transducer overload | Output current of transducer is too high | un-resumadie |
| 114 | 72 | Voltage too low of DC bus line of transducer | Voltage of power source is too low | |





| Digital tube indication on master unit | Indication on wired controller (hex) | Failure code definition | Failure description | Remarks |
|--|--|---|---|--|
| 115 | 73 | Voltage too high of DC bus line of transducer | Voltage of power source is too high | 3 times in an hour, confirm failure; once confirmation, un-resumable |
| 116 | 74 | Communication abnormal between transducer and control PCB | Communication is disconnected | Resumable |
| 117 | 75 | Transducer over current (software) | Compressor startup fails for 5 times continuously, or compressor is running down till stops caused by over current or over heat | |
| 118 | 76 | Compressor startup failure | The sensor used for current detecting of transducer is abnormal, disconnected or incorrectly connection | 3 times in an hour, confirm |
| 119 | 11977Detecting circuit of transducer current is abnormal | | Current detection sensor of frequency controller is abnormal or unconnected or connected wrongly. | confirmation, un-resumable |
| 120 | 78 | Power supply of transducer abnormal | Power supply of transducer is broken down instantly | |
| 121 | 79 | Power supply of inverter board is abnormal | Power supply of inverter board is broken down instantly | |
| 122 | 7A | Radiator temp. sensor of transducer abnormal | Resistor of temp. sensor abnormal or temp. sensor disconnected | 3 times in an hour, confirm failure; once confirmation, |
| 123 | 7B | Transient over current in IPM module rectifier side hardware | Transient over current in IPM module rectifier side hard ware | un-resumable |

When there is no failure, if the starting condition can not be met, digital tube on master unit will display stand-by code:

| 555.1 | Outdoor ambient temperature too high (heating) | Ta>27°C, Standby | |
|-------|---|------------------------------|-----------|
| 555.3 | Outdoor ambient temperature too high or too low (cooling) | Ta>54°C or Ta<-10°C, Standby | Resumable |

Fault light mode: red indicator LED1 represents ten digits, green indicator LED3 represents a single digit. If it is 26-0, the red LED1 flashes 2 times, then the green LED3 flashes 6 times. Cycle display like this. If it is 111-1, the red LED1 flashes 11 times, then the green LED3 flashes 1 time, then the red LED1 is always on and the green LED3 flashes once. Cycle display like this. If it is 555.0, the red LED1 and green LED3 are always on.

If it is 555.4, the red LED1 and the green LED3 flash 4 times at the same time. Cycle display

The frequency of LED flashes is 2 Hz and the interval flashes time is 2 seconds.

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[20~24] Temperature sensor failure



[28, 29] High/low pressure sensor failure







[26-0, 26-1, 26-2] Communication circuit between indoor and outdoor







[33] Outdoor EEPROM failure



[35] 4-way valve reversing failure



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[30] High pressure switch shutoff failure



[34] Protection of discharging temp. too high



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[36] Protection of oil temperature too low



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[39-0, 39-1] Low pressure too low and compression ratio too high



[39-2] Compression ratio too low







[40] High pressure protection



_





[43] Discharging temp. sensor Td too low protection



[46] Communication with inverter module failure



.





[49] Low pressure switch failure



[53] Current sensor failure



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[64] CT over current







[71] DC motor blocked



_





[75] No pressure drop between high pressure and low one







[82] Compressor current protection

[108] Transient over current in IPM module rectifier side software

[109 Current detection circuit abnormality

[123] Transient over current in IPM module rectifier side hardware







[110] Power module overcurrent



_





[111] Compressor out of control



[81] IPM modular temp. too high protection [112] Radiator of transducer temp. too high







[113] Protection of overload



[114] Voltage too low of DC bus line of transducer







[115] Voltage too high of DC bus line of transducer



[116] Communication abnormal between transducer (inverter module board) and control PCB







[117] Transducer over current (software protection)



[118] Compressor startup failure



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[119] Current detecting circuit abnormal of transducer



[122] Radiator temp. sensor of transducer abnormal







[120] Power supply of transducer abnormal











Sensor characteristic

Temp. sensor characteristic

| No. | Sensor type | Characteristic | | |
|-----|---|----------------|----------------------|--|
| 1 | Indoor coil/outdoor suction/oil temp./defrost/ambient | R (25°C)=10KO | B (25°C/50°C)=3700K | |
| | temp. sensor | | | |
| 2 | Wired controller ambient temp./indoor ambient temp. | R (25°C)=23KO | B (25°C/50°C)=4200K | |
| | sensor | | B (20 8/00 8) 120010 | |
| 3 | Outdoor discharging temp. sensor | R (80°C)=50KΩ | B (25°C/80°C)=4450K | |

Herein, the sensor typical resistor is as follows: (1) R (25°C)=10K Ω B (25°C/50°C)=3700K

| R25=10KΩ±3% B25/50=3700K±3% | | | | | | |
|-----------------------------|--------|-----------------|--------|-----------------|---------|--|
| Temp | | Resistance (KΩ) | | % (Resist. tol) | | |
| (°C) | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| -30 | 145.82 | 135.02 | 124.22 | 7.00 | 7.00 | |
| -29 | 138.07 | 129.13 | 120.18 | 6.93 | 6.93 | |
| -28 | 131.79 | 123.34 | 114.89 | 6.85 | 6.85 | |
| -27 | 125.67 | 117.68 | 109.70 | 6.78 | 6.78 | |
| -26 | 119.71 | 112.18 | 104.65 | 6.71 | 6.71 | |
| -25 | 113.93 | 106.84 | 99.75 | 6.64 | 6.64 | |
| -24 | 108.36 | 101.69 | 95.01 | 6.56 | 6.56 | |
| -23 | 103.00 | 96.72 | 90.44 | 6.49 | 6.49 | |
| -22 | 97.85 | 91.95 | 86.05 | 6.42 | 6.42 | |
| -21 | 92.92 | 87.37 | 81.83 | 6.35 | 6.35 | |
| -20 | 88.20 | 82.99 | 77.79 | 6.27 | 6.27 | |
| -19 | 83.70 | 78.82 | 73.93 | 6.20 | 6.20 | |
| -18 | 79.42 | 74.83 | 70.25 | 6.13 | 6.13 | |
| -17 | 75.34 | 71.04 | 66.74 | 6.05 | 6.05 | |
| -16 | 71.47 | 67.44 | 63.40 | 5.98 | 5.98 | |
| -15 | 67.80 | 64.02 | 60.23 | 5.91 | 5.91 | |
| -14 | 64.32 | 60.77 | 57.22 | 5.84 | 5.84 | |
| -13 | 61.02 | 57.69 | 54.37 | 5.76 | 5.76 | |
| -12 | 57.90 | 54.78 | 51.66 | 5.69 | 5.69 | |
| -11 | 54.94 | 52.02 | 49.10 | 5.62 | 5.62 | |
| -10 | 52.15 | 49.41 | 46.67 | 5.55 | 5.55 | |
| -9 | 49.51 | 46.94 | 44.37 | 5.47 | 5.47 | |
| -8 | 47.02 | 44.61 | 42.20 | 5.40 | 5.40 | |
| -7 | 44.66 | 42.40 | 40.14 | 5.33 | 5.33 | |
| -6 | 42.43 | 40.32 | 38.20 | 5.25 | 5.25 | |
| -5 | 40.33 | 38.35 | 36.36 | 5.18 | 5.18 | |
| -4 | 38.35 | 36.48 | 34.62 | 5.11 | 5.11 | |
| -3 | 36.47 | 34.72 | 32.97 | 5.04 | 5.04 | |
| -2 | 34.70 | 33.06 | 31.42 | 4.96 | 4.96 | |
| -1 | 33.03 | 31.49 | 29.95 | 4.89 | 4.89 | |
| 0 | 31.45 | 30.00 | 28.56 | 4.82 | 4.82 | |
| 1 | 29.95 | 28.59 | 27.24 | 4.75 | 4.75 | |
| 2 | 28.54 | 27.26 | 25.99 | 4.67 | 4.67 | |
| 3 | 27.20 | 26.01 | 24.81 | 4.60 | 4.60 | |
| 4 | 25.94 | 24.82 | 23.69 | 4.53 | 4.53 | |
| 5 | 24.74 | 23.69 | 22.63 | 4.45 | 4.45 | |
| 6 | 23.61 | 22.62 | 21.63 | 4.38 | 4.38 | |





| R25=10KΩ±3% B25/50=3700K±3% | | | | | |
|-----------------------------|-----------------|--------------|-------|-----------------|---------|
| Temp | Resistance (KΩ) | | | % (Resist. tol) | |
| (°C) | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) |
| 7 | 22.54 | 21.61 | 20.68 | 4.31 | 4.31 |
| 8 | 21.52 | 20.65 | 19.77 | 4.24 | 4.24 |
| 9 | 20.56 | 19.74 | 18.92 | 4.16 | 4.16 |
| 10 | 19.65 | 18.87 | 18.10 | 4.09 | 4.09 |
| 11 | 18.78 | 18.05 | 17.33 | 4.02 | 4.02 |
| 12 | 17.96 | 17.28 | 16.59 | 3.95 | 3.95 |
| 13 | 17.18 | 16.54 | 15.90 | 3.87 | 3.87 |
| 14 | 16.44 | 15.83 | 15.23 | 3.80 | 3.80 |
| 15 | 15.73 | 15.17 | 14.60 | 3.73 | 3.73 |
| 16 | 15.06 | 14.53 | 14.00 | 3.65 | 3.65 |
| 17 | 14.42 | 13.93 | 13.43 | 3.58 | 3.58 |
| 18 | 13.82 | 13.35 | 12.88 | 3.51 | 3.51 |
| 19 | 13.24 | 12.80 | 12.36 | 3.44 | 3.44 |
| 20 | 12.69 | 12.28 | 11.86 | 3.36 | 3.36 |
| 21 | 12.17 | 11.78 | 11.39 | 3.29 | 3.29 |
| 22 | 11.67 | 11.30 | 10.94 | 3.22 | 3.22 |
| 23 | 11.19 | 10.85 | 10.51 | 3.15 | 3.15 |
| 24 | 10.73 | 10.41 | 10.09 | 3.07 | 3.07 |
| 25 | 10.30 | 10.00 | 9.70 | 3.00 | 3.00 |
| 26 | 9.90 | 9.60 | 9.31 | 3.06 | 3.06 |
| 27 | 9.51 | 9.23 | 8.94 | 3.13 | 3.13 |
| 28 | 9.15 | 8.86 | 8.58 | 3.19 | 3.19 |
| 29 | 8.80 | 8.52 | 8.24 | 3.25 | 3.25 |
| 30 | 8.46 | 8.19 | 7.92 | 3.31 | 3.31 |
| 31 | 8.14 | 7.87 | 7.61 | 3.38 | 3.38 |
| 32 | 7.83 | 7.57 | 7.31 | 3.44 | 3.44 |
| 33 | 7.53 | 7.28 | 7.02 | 3.50 | 3.50 |
| 34 | 7.25 | 7.00 | 6.75 | 3.56 | 3.56 |
| 35 | 6.98 | 6.73 | 6.49 | 3.63 | 3.63 |
| 36 | 6.72 | 6.48 | 6.24 | 3.69 | 3.69 |
| 37 | 6.47 | 6.23 | 6.00 | 3.75 | 3.75 |
| 38 | 6.23 | 6.00 | 5.77 | 3.81 | 3.81 |
| 39 | 6.00 | 5.77 | 5.55 | 3.88 | 3.88 |
| 40 | 5.78 | 5.56 | 5.34 | 3.94 | 3.94 |
| 41 | 5.56 | 5.35 | 5.14 | 4.00 | 4.00 |
| 42 | 5.36 | 5.15 | 4.94 | 4.06 | 4.06 |
| 43 | 5.17 | 4.96 | 4.76 | 4.13 | 4.13 |
| 44 | 4.98 | 4.78 | 4.58 | 4.19 | 4.19 |
| 45 | 4.80 | 4.60 | 4.41 | 4.25 | 4.25 |
| 46 | 4.63 | 4.43 | 4.24 | 4.31 | 4.31 |
| 47 | 4.46 | 4.27 | 4.09 | 4.38 | 4.38 |
| 48 | 4.30 | 4.12 | 3.94 | 4.44 | 4.44 |
| 49 | 4.15 | 3.97 | 3.79 | 4.50 | 4.50 |
| 50 | 4.00 | 3.83 | 3.65 | 4.56 | 4.56 |
| 51 | 3.86 | 3.69 | 3.52 | 4.63 | 4.63 |
| 52 | 3.72 | 3.56 | 3.39 | 4.69 | 4.69 |
| 53 | 3.59 | 3.43 | 3.27 | 4.75 | 4.75 |
| 54 | 3.47 | 3.31 | 3.15 | 4.81 | 4.81 |
| 55 | 3.35 | 3.19 | 3.04 | 4.88 | 4.88 |
| 56 | 3.23 | 3.08 | 2.93 | 4.94 | 4.94 |




| R25=10KΩ±3% B25/50=3700K±3% | | | | | | |
|-----------------------------|-----------------|--------------|------|-----------------|---------|--|
| Temp | Resistance (KΩ) | | | % (Resist. tol) | | |
| (°C) | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| 57 | 3.12 | 2.97 | 2.83 | 5.00 | 5.00 | |
| 58 | 3.02 | 2.87 | 2.73 | 5.06 | 5.06 | |
| 59 | 2.91 | 2.77 | 2.63 | 5.13 | 5.13 | |
| 60 | 2.82 | 2.68 | 2.54 | 5.19 | 5.19 | |
| 61 | 2.72 | 2.59 | 2.45 | 5.25 | 5.25 | |
| 62 | 2.63 | 2.50 | 2.36 | 5.31 | 5.31 | |
| 63 | 2.54 | 2.41 | 2.28 | 5.38 | 5.38 | |
| 64 | 2.46 | 2.33 | 2.21 | 5.44 | 5.44 | |
| 65 | 2.38 | 2.26 | 2.13 | 5.50 | 5.50 | |
| 66 | 2.30 | 2.18 | 2.06 | 5.56 | 5.56 | |
| 67 | 2.23 | 2.11 | 1.99 | 5.63 | 5.63 | |
| 68 | 2.16 | 2.04 | 1.92 | 5.69 | 5.69 | |
| 69 | 2.09 | 1.97 | 1.86 | 5.75 | 5.75 | |
| 70 | 2.02 | 1.91 | 1.80 | 5.81 | 5.81 | |
| 71 | 1.96 | 1.85 | 1.74 | 5.88 | 5.88 | |
| 72 | 1.90 | 1.79 | 1.69 | 5.94 | 5.94 | |
| 73 | 1.84 | 1.74 | 1.63 | 6.00 | 6.00 | |
| 74 | 1.78 | 1.68 | 1.58 | 6.06 | 6.06 | |
| 75 | 1.73 | 1.63 | 1.53 | 6.13 | 6.13 | |
| 76 | 1.68 | 1.58 | 1.48 | 6.19 | 6.19 | |
| 77 | 1.63 | 1.53 | 1.43 | 6.25 | 6.25 | |
| 78 | 1.58 | 1.48 | 1.39 | 6.31 | 6.31 | |
| 79 | 1.53 | 1.44 | 1.35 | 6.38 | 6.38 | |
| 80 | 1.49 | 1.40 | 1.31 | 6.44 | 6.44 | |
| 81 | 1.44 | 1.36 | 1.27 | 6.50 | 6.50 | |
| 82 | 1.40 | 1.32 | 1.23 | 6.56 | 6.56 | |
| 83 | 1.36 | 1.28 | 1.19 | 6.63 | 6.63 | |
| 84 | 1.32 | 1.24 | 1.16 | 6.69 | 6.69 | |
| 85 | 1.29 | 1.20 | 1.12 | 6.75 | 6.75 | |
| 86 | 1.25 | 1.17 | 1.09 | 6.81 | 6.81 | |
| 87 | 1.21 | 1.14 | 1.06 | 6.88 | 6.88 | |
| 88 | 1.18 | 1.10 | 1.03 | 6.94 | 6.94 | |
| 89 | 1.15 | 1.07 | 1.00 | 7.00 | 7.00 | |
| 90 | 1.12 | 1.04 | 0.97 | 7.06 | 7.06 | |
| 91 | 1.09 | 1.01 | 0.94 | 7.13 | 7.13 | |
| 92 | 1.06 | 0.99 | 0.91 | 7.19 | 7.19 | |
| 93 | 1.03 | 0.96 | 0.89 | 7.25 | 7.25 | |
| 94 | 1.00 | 0.93 | 0.86 | 7.31 | 7.31 | |
| 95 | 0.97 | 0.90 | 0.84 | 7.38 | 7.38 | |
| 96 | 0.94 | 0.88 | 0.81 | 7.44 | 7.44 | |
| 97 | 0.92 | 0.85 | 0.79 | 7.50 | 7.50 | |
| 98 | 0.89 | 0.83 | 0.77 | 7.56 | 7.56 | |
| 99 | 0.87 | 0.81 | 0.75 | 7.63 | 7.63 | |
| 100 | 0.84 | 0.78 | 0.72 | 7.69 | 7.69 | |
| 101 | 0.82 | 0.76 | 0.70 | 7.75 | 7.75 | |
| 102 | 0.80 | 0.74 | 0.68 | 7.81 | 7.81 | |
| 103 | 0.77 | 0.72 | 0.66 | 7.88 | 7.88 | |
| 104 | 0.75 | 0.69 | 0.64 | 7.94 | 7.94 | |
| 105 | 0.73 | 0.67 | 0.62 | 8.00 | 8.00 | |





(2) R (25°C)=23KΩ B (25°C/50°C)=4200K

| R25=23KΩ±3% B25/50=4200K±3% | | | | | | |
|-----------------------------|-----------------|--------------|----------------|-----------------|---------|--|
| Temp | Resistance (KΩ) | | | % (Resist. tol) | | |
| °C | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| -30 | 538.77 | 513.12 | 487.46 | 5.00 | 5.00 | |
| -29 | 502.58 | 478.89 | 455.21 | 4.95 | 4.95 | |
| -28 | 469.29 | 447.41 | 425.53 | 4.89 | 4.89 | |
| -27 | 438.61 | 418.38 | 398.15 | 4.84 | 4.84 | |
| -26 | 410.29 | 391.56 | 372.84 | 4.78 | 4.78 | |
| -25 | 384.09 | 366.75 | 349.41 | 4.73 | 4.73 | |
| -24 | 359.82 | 343.75 | 327.69 | 4.67 | 4.67 | |
| -23 | 337.30 | 322.41 | 307.52 | 4.62 | 4.62 | |
| -22 | 316.38 | 302.57 | 288.76 | 4.56 | 4.56 | |
| -21 | 296.92 | 284.11 | 271.29 | 4.51 | 4.51 | |
| -20 | 278.79 | 266.91 | 255.02 | 4.45 | 4.45 | |
| -19 | 261.90 | 250.87 | 239.83 | 4.40 | 4.40 | |
| -18 | 246.15 | 235.90 | 225.64 | 4.35 | 4.35 | |
| -17 | 231.43 | 221.91 | 212.39 | 4.29 | 4.29 | |
| -16 | 217.69 | 208.84 | 199.99 | 4.24 | 4.24 | |
| -15 | 204.83 | 196.61 | 188.39 | 4.18 | 4.18 | |
| -14 | 192.81 | 185.16 | 177.52 | 4.13 | 4.13 | |
| -13 | 181.55 | 174.44 | 167.34 | 4.07 | 4.07 | |
| -12 | 171.01 | 164.40 | 157.79 | 4.02 | 4.02 | |
| -11 | 161.13 | 154.98 | 148.84 | 3.96 | 3.96 | |
| -10 | 151.87 | 146.15 | 140.44 | 3.91 | 3.91 | |
| -9 | 143.18 | 137.87 | 132.56 | 3.85 | 3.85 | |
| -8 | 135.04 | 130.10 | 125.15 | 3.80 | 3.80 | |
| -7 | 127.40 | 122.80 | 118.20 | 3.75 | 3.75 | |
| -6 | 120.23 | 115.95 | 111.67 | 3.69 | 3.69 | |
| -5 | 113.49 | 109.51 | 105.53 | 3.64 | 3.64 | |
| -4 | 107.17 | 103.46 | 99.76 | 3.58 | 3.58 | |
| -3 | 101.23 | 97.78 | 94.33 | 3.53 | 3.53 | |
| -2 | 95.65 | 92.44 | 89.23 | 3.47 | 3.47 | |
| -1 | 90.40 | 87.42 | 84.43 | 3.42 | 3.42 | |
| 0 | 85.47 | 82.69 | 79.91 | 3.36 | 3.36 | |
| 1 | 80.84 | 78.25 | 75.66 | 3.31 | 3.31 | |
| 2 | 76.48 | 74.07 | 71.66 | 3.25 | 3.25 | |
| 3 | /2.38 | 70.13 | 67.89 | 3.20 | 3.20 | |
| 4 | 68.52 | 66.43 | 64.34 | 3.15 | 3.15 | |
| 5 | 64.89 | 62.94 | 61.00 | 3.09 | 3.09 | |
| 6 | 61.4/ | 59.66 | 57.85 | 3.04 | 3.04 | |
| 1 | 58.25 | 50.57 | 54.88 | 2.98 | 2.98 | |
| 8 | 55.22 | 53.65 | 52.08 | 2.93 | 2.93 | |
| 9 | JZ.31 | | 49.44 | <u> </u> | 2.87 | |
| | 49.00 | 40.31 | 40.95 | 2.82 | 2.82 | |
| | 47.14 | 40.87 | 44.60 | 2.70 | 2.70 | |
| 12 | 44./0 | 43.37 | 42.39 | 2./1 | 2.11 | |
| 13 | 42.49 | 41.40 | 40.30 | 2.00 | 2.00 | |
| 14 | 40.37 | 29.34 | 30.32 26.4E | 2.00 | 2.00 | |
| 10 | 36.30 | 37.41 | 30.43 | 2.00 | 2.00 | |
| 10 | 30.40 | 30.00 | 34.09 | 2.49 | 2.49 | |
| | 34.07 | 33.03 | 33.UZ | <u> </u> 2.44 | Z.44 | |





| R25=23KΩ±3% B25/50=4200K±3% | | | | | | |
|-----------------------------|---------------------------------|--------------|-------|---------|---------|--|
| Temp | Resistance (KΩ) % (Resist. tol) | | | | | |
| °C | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| 18 | 32.98 | 32.22 | 31.45 | 2.38 | 2.38 | |
| 19 | 31.39 | 30.67 | 29.96 | 2.33 | 2.33 | |
| 20 | 29.87 | 29.21 | 28.55 | 2.27 | 2.27 | |
| 21 | 28.45 | 27.83 | 27.21 | 2.22 | 2.22 | |
| 22 | 27.10 | 26.52 | 25.95 | 2.16 | 2.16 | |
| 23 | 25.82 | 25.28 | 24.75 | 2.11 | 2.11 | |
| 24 | 24.61 | 24.11 | 23.62 | 2.05 | 2.05 | |
| 25 | 23.46 | 23.00 | 22.54 | 2.00 | 2.00 | |
| 26 | 22.40 | 21.95 | 21.50 | 2.04 | 2.04 | |
| 27 | 21.39 | 20.95 | 20.51 | 2.09 | 2.09 | |
| 28 | 20.43 | 20.00 | 19.58 | 2.13 | 2.13 | |
| 29 | 19.52 | 19.10 | 18.69 | 2.18 | 2.18 | |
| 30 | 18.66 | 18.25 | 17.85 | 2.22 | 2.22 | |
| 31 | 17.84 | 17.44 | 17.05 | 2.26 | 2.26 | |
| 32 | 17.06 | 16.67 | 16.29 | 2.31 | 2.31 | |
| 33 | 16.32 | 15.94 | 15.57 | 2.35 | 2.35 | |
| 34 | 15.61 | 15.25 | 14.88 | 2.39 | 2.39 | |
| 35 | 14.94 | 14.59 | 14.23 | 2.44 | 2.44 | |
| 36 | 14.31 | 13.96 | 13.61 | 2.48 | 2.48 | |
| 37 | 13.70 | 13.36 | 13.03 | 2.53 | 2.53 | |
| 38 | 13.12 | 12.79 | 12.47 | 2.57 | 2.57 | |
| 39 | 12.57 | 12.25 | 11.93 | 2.61 | 2.61 | |
| 40 | 12.05 | 11.74 | 11.42 | 2.66 | 2.66 | |
| 41 | 11.55 | 11.24 | 10.94 | 2.70 | 2.70 | |
| 42 | 11.07 | 10.78 | 10.48 | 2.74 | 2.74 | |
| 43 | 10.62 | 10.33 | 10.04 | 2.79 | 2.79 | |
| 44 | 10.18 | 9.90 | 9.62 | 2.83 | 2.83 | |
| 45 | 9.77 | 9.50 | 9.22 | 2.88 | 2.88 | |
| 46 | 9.38 | 9.11 | 8.84 | 2.92 | 2.92 | |
| 47 | 9.00 | 8.74 | 8.48 | 2.96 | 2.96 | |
| 48 | 8.64 | 8.39 | 8.14 | 3.01 | 3.01 | |
| 49 | 8.30 | 8.05 | 7.80 | 3.05 | 3.05 | |
| 50 | 7.97 | 7.73 | 7.49 | 3.09 | 3.09 | |
| 51 | 7.65 | 7.42 | 7.19 | 3.14 | 3.14 | |
| 52 | 7.35 | 7.13 | 6.90 | 3.18 | 3.18 | |
| 53 | 7.07 | 6.85 | 6.63 | 3.23 | 3.23 | |
| 54 | 6.79 | 6.58 | 6.36 | 3.27 | 3.27 | |
| 55 | 6.53 | 6.32 | 6.11 | 3.31 | 3.31 | |
| 56 | 6.28 | 6.08 | 5.87 | 3.36 | 3.36 | |
| 57 | 6.04 | 5.84 | 5.64 | 3.40 | 3.40 | |
| 58 | 5.81 | 5.62 | 5.43 | 3.44 | 3.44 | |
| 59 | 5.59 | 5.40 | 5.22 | 3.49 | 3.49 | |
| 60 | 5.38 | 5.20 | 5.02 | 3.53 | 3.53 | |
| 61 | 5.18 | 5.00 | 4.82 | 3.58 | 3.58 | |
| 62 | 4.99 | 4.82 | 4.64 | 3.62 | 3.62 | |
| 63 | 4.81 | 4.64 | 4.47 | 3.66 | 3.66 | |
| 64 | 4.63 | 4.46 | 4.30 | 3.71 | 3.71 | |
| 65 | 4.46 | 4.30 | 4.14 | 3.75 | 3.75 | |
| 66 | 4.30 | 4.14 | 3.99 | 3.79 | 3.79 | |





| R25=23KΩ±3% B25/50=4200K±3% | | | | | | |
|-----------------------------|-----------------|--------------|------|-----------------|---------|--|
| Temp | Resistance (KΩ) | | | % (Resist. tol) | | |
| C° | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| 67 | 4.15 | 3.99 | 3.84 | 3.84 | 3.84 | |
| 68 | 4.00 | 3.85 | 3.70 | 3.88 | 3.88 | |
| 69 | 3.86 | 3.71 | 3.56 | 3.93 | 3.93 | |
| 70 | 3.72 | 3.58 | 3.44 | 3.97 | 3.97 | |
| 71 | 3.59 | 3.45 | 3.31 | 4.01 | 4.01 | |
| 72 | 3.47 | 3.33 | 3.20 | 4.06 | 4.06 | |
| 73 | 3.35 | 3.22 | 3.08 | 4.10 | 4.10 | |
| 74 | 3.23 | 3.10 | 2.98 | 4.14 | 4.14 | |
| 75 | 3.12 | 3.00 | 2.87 | 4.19 | 4.19 | |
| 76 | 3.02 | 2.90 | 2.77 | 4.23 | 4.23 | |
| 77 | 2.92 | 2.80 | 2.68 | 4.28 | 4.28 | |
| 78 | 2.82 | 2.70 | 2.59 | 4.32 | 4.32 | |
| 79 | 2.73 | 2.61 | 2.50 | 4.36 | 4.36 | |
| 80 | 2.64 | 2.53 | 2.42 | 4.41 | 4.41 | |
| 81 | 2.56 | 2.45 | 2.34 | 4.45 | 4.45 | |
| 82 | 2.47 | 2.37 | 2.26 | 4.49 | 4.49 | |
| 83 | 2.39 | 2.29 | 2.19 | 4.54 | 4.54 | |
| 84 | 2.32 | 2.22 | 2.12 | 4.58 | 4.58 | |
| 85 | 2.25 | 2.15 | 2.05 | 4.63 | 4.63 | |
| 86 | 2.18 | 2.08 | 1.98 | 4.67 | 4.67 | |
| 87 | 2.11 | 2.02 | 1.92 | 4.71 | 4.71 | |
| 88 | 2.05 | 1.95 | 1.86 | 4.76 | 4.76 | |
| 89 | 1.98 | 1.89 | 1.80 | 4.80 | 4.80 | |
| 90 | 1.92 | 1.83 | 1.75 | 4.84 | 4.84 | |
| 91 | 1.87 | 1.78 | 1.69 | 4.89 | 4.89 | |
| 92 | 1.81 | 1.72 | 1.64 | 4.93 | 4.93 | |
| 93 | 1.76 | 1.67 | 1.59 | 4.98 | 4.98 | |
| 94 | 1.70 | 1.62 | 1.54 | 5.02 | 5.02 | |
| 95 | 1.65 | 1.57 | 1.49 | 5.06 | 5.06 | |
| 96 | 1.60 | 1.52 | 1.45 | 5.11 | 5.11 | |
| 97 | 1.55 | 1.48 | 1.40 | 5.15 | 5.15 | |
| 98 | 1.51 | 1.43 | 1.36 | 5.19 | 5.19 | |
| 99 | 1.46 | 1.39 | 1.32 | 5.24 | 5.24 | |
| 100 | 1.42 | 1.35 | 1.28 | 5.28 | 5.28 | |
| 101 | 1.37 | 1.31 | 1.24 | 5.33 | 5.33 | |
| 102 | 1.33 | 1.26 | 1.20 | 5.37 | 5.37 | |
| 103 | 1.29 | 1.22 | 1.16 | 5.41 | 5.41 | |
| 104 | 1.25 | 1.18 | 1.12 | 5.46 | 5.46 | |
| 105 | 1.21 | 1.15 | 1.08 | 5.50 | 5.50 | |

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(3) R (80°C)=50KΩ B (25°C/80°C)=4450K

| R80=50KΩ±3% B25/80=4450K±3% | | | | | | |
|-----------------------------|-----------------|--------------|---------|----------------|---------|--|
| Temp | Resistance (KΩ) | | | % (Resist.tol) | | |
| °C | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| 0 | 1749.01 | 1921.99 | 2094.97 | 9.00 | 9.00 | |
| 1 | 1651.43 | 1813.27 | 1975.10 | 8.93 | 8.93 | |
| 2 | 1560.17 | 1711.65 | 1863.13 | 8.85 | 8.85 | |
| 3 | 1474.74 | 1616.59 | 1758.45 | 8.78 | 8.78 | |
| 4 | 1394.71 | 1527.61 | 1660.51 | 8.70 | 8.70 | |
| 5 | 1319.68 | 1444.25 | 1568.82 | 8.63 | 8.63 | |
| 6 | 1249.30 | 1366.10 | 1482.90 | 8.55 | 8.55 | |
| 7 | 1183.21 | 1292.77 | 1402.34 | 8.48 | 8.48 | |
| 8 | 1121.12 | 1223.94 | 1326.75 | 8.40 | 8.40 | |
| 9 | 1062.76 | 1159.27 | 1255.77 | 8.33 | 8.33 | |
| 10 | 1007.85 | 1098.47 | 1189.10 | 8.25 | 8.25 | |
| 11 | 956.17 | 1041.29 | 1126.42 | 8.18 | 8.18 | |
| 12 | 907.49 | 987.48 | 1067.46 | 8.10 | 8.10 | |
| 13 | 861.62 | 936.80 | 1011.98 | 8.03 | 8.03 | |
| 14 | 818.37 | 889.05 | 959.73 | 7.95 | 7.95 | |
| 15 | 777.57 | 844.04 | 910.51 | 7.88 | 7.88 | |
| 16 | 739.07 | 801.59 | 864.11 | 7.80 | 7.80 | |
| 17 | 702.71 | 761.53 | 820.36 | 7.73 | 7.73 | |
| 18 | 668.35 | /23.72 | 779.08 | 7.65 | 7.65 | |
| 19 | 635.89 | 688.00 | 740.12 | 7.58 | 7.58 | |
| 20 | 605.19 | 654.25 | 703.32 | 7.50 | 7.50 | |
| 21 | 5/6.15 | 622.30 | 608.57 | 7.43 | 7.43 | |
| 22 | 540.00 | 592.19 | 604.66 | 7.30 | 7.35 | |
| 23 | <u> </u> | 536.64 | 575.29 | 7.20 | 7.20 | |
| 24 | 490.01 | 511.08 | 547.40 | 7.20 | 7.20 | |
| 25 | 452.54 | 486.86 | 521 19 | 7.15 | 7.15 | |
| 20 | 431 56 | 463.92 | 496.28 | 6.98 | 6.98 | |
| 28 | 411.67 | 442 18 | 472 69 | 6.90 | 6.90 | |
| 29 | 392.80 | 421.57 | 450.34 | 6.83 | 6.83 | |
| 30 | 374.89 | 402.03 | 429.17 | 6.75 | 6.75 | |
| 31 | 357.89 | 383.49 | 409.09 | 6.68 | 6.68 | |
| 32 | 341.75 | 365.90 | 390.05 | 6.60 | 6.60 | |
| 33 | 326.42 | 349.20 | 371.99 | 6.53 | 6.53 | |
| 34 | 311.85 | 333.35 | 354.85 | 6.45 | 6.45 | |
| 35 | 298.00 | 318.30 | 338.59 | 6.38 | 6.38 | |
| 36 | 284.84 | 304.00 | 323.15 | 6.30 | 6.30 | |
| 37 | 272.33 | 290.41 | 308.49 | 6.23 | 6.23 | |
| 38 | 260.43 | 277.49 | 294.56 | 6.15 | 6.15 | |
| 39 | 249.10 | 265.22 | 281.33 | 6.08 | 6.08 | |
| 40 | 238.33 | 253.54 | 268.75 | 6.00 | 6.00 | |
| 41 | 228.07 | 242.44 | 256.80 | 5.93 | 5.93 | |
| 42 | 218.31 | 231.87 | 245.44 | 5.85 | 5.85 | |
| 43 | 209.01 | 221.82 | 234.63 | 5.78 | 5.78 | |
| 44 | 200.15 | 212.25 | 224.35 | 5.70 | 5.70 | |
| 45 | 191.72 | 203.14 | 214.57 | 5.63 | 5.63 | |
| 46 | 183.67 | 194.47 | 205.26 | 5.55 | 5.55 | |
| 47 | 176.01 | 186.20 | 196.40 | 5.48 | 5.48 | |





| R80=50KΩ±3% B25/80=4450K±3% | | | | | | |
|-----------------------------|-----------------|--------------|--------|----------------|---------|--|
| Temp | Resistance (KΩ) | | | % (Resist.tol) | | |
| °C | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| 48 | 168.70 | 178.33 | 187.96 | 5.40 | 5.40 | |
| 49 | 161.74 | 170.83 | 179.93 | 5.33 | 5.33 | |
| 50 | 155.09 | 163.68 | 172.28 | 5.25 | 5.25 | |
| 51 | 148.75 | 156.87 | 164.98 | 5.18 | 5.18 | |
| 52 | 142.70 | 150.37 | 158.04 | 5.10 | 5.10 | |
| 53 | 136.92 | 144.17 | 151.41 | 5.03 | 5.03 | |
| 54 | 131.41 | 138.26 | 145.10 | 4.95 | 4.95 | |
| 55 | 126.15 | 132.61 | 139.08 | 4.88 | 4.88 | |
| 56 | 121.12 | 127.23 | 133.34 | 4.80 | 4.80 | |
| 57 | 116.32 | 122.09 | 127.86 | 4.73 | 4.73 | |
| 58 | 111.73 | 117.18 | 122.63 | 4.65 | 4.65 | |
| 59 | 107.35 | 112.49 | 117.64 | 4.58 | 4.58 | |
| 60 | 103.16 | 108.02 | 112.88 | 4.50 | 4.50 | |
| 61 | 99.15 | 103.74 | 108.33 | 4.43 | 4.43 | |
| 62 | 95.32 | 99.65 | 103.99 | 4.35 | 4.35 | |
| 63 | 91.66 | 95.75 | 99.84 | 4.28 | 4.28 | |
| 64 | 88.15 | 92.01 | 95.88 | 4.20 | 4.20 | |
| 65 | 84.80 | 88.44 | 92.09 | 4.13 | 4.13 | |
| 66 | 81.58 | 85.03 | 88.47 | 4.05 | 4.05 | |
| 67 | 78.51 | 81.76 | 85.01 | 3.98 | 3.98 | |
| 68 | 75.57 | 78.64 | 81.70 | 3.90 | 3.90 | |
| 69 | 72.75 | 75.65 | 78.54 | 3.83 | 3.83 | |
| 70 | 70.05 | 72.78 | 75.51 | 3.75 | 3.75 | |
| 71 | 67.47 | 70.04 | 72.61 | 3.68 | 3.68 | |
| 72 | 64.99 | 67.42 | 69.84 | 3.60 | 3.60 | |
| 73 | 62.61 | 64.90 | 67.19 | 3.53 | 3.53 | |
| 74 | 60.34 | 62.49 | 64.65 | 3.45 | 3.45 | |
| 75 | 58.15 | 60.19 | 62.22 | 3.38 | 3.38 | |
| 76 | 56.06 | 57.97 | 59.89 | 3.30 | 3.30 | |
| 77 | 54.05 | 55.85 | 57.65 | 3.23 | 3.23 | |
| 78 | 52.13 | 53.82 | 55.52 | 3.15 | 3.15 | |
| 79 | 50.28 | 51.87 | 53.47 | 3.08 | 3.08 | |
| 80 | 48.50 | 50.00 | 51.50 | 3.00 | 3.00 | |
| 81 | 46.73 | 48.21 | 49.68 | 3.07 | 3.07 | |
| 82 | 45.03 | 46.48 | 47.94 | 3.13 | 3.13 | |
| 83 | 43.40 | 44.83 | 46.27 | 3.20 | 3.20 | |
| 84 | 41.83 | 43.25 | 44.66 | 3.27 | 3.27 | |
| 85 | 40.33 | 41.72 | 43.11 | 3.33 | 3.33 | |
| 86 | 38.89 | 40.26 | 41.63 | 3.40 | 3.40 | |
| 87 | 37.51 | 38.86 | 40.20 | 3.47 | 3.47 | |
| 88 | 36.18 | 37.51 | 38.83 | 3.53 | 3.53 | |
| 89 | 34.91 | 36.21 | 37.51 | 3.60 | 3.60 | |
| 90 | 33.68 | 34.96 | 36.24 | 3.67 | 3.67 | |
| 91 | 32.50 | 33.76 | 35.03 | 3.73 | 3.73 | |
| 92 | 31.37 | 32.61 | 33.85 | 3.80 | 3.80 | |
| 93 | 30.29 | 31.50 | 32.72 | 3.87 | 3.87 | |
| 94 | 29.24 | 30.44 | 31.64 | 3.93 | 3.93 | |
| 95 | 28.24 | 29.41 | 30.59 | 4.00 | 4.00 | |
| 96 | 27.27 | 28.43 | 29.58 | 4.07 | 4.07 | |





| R80=50KΩ±3% B25/80=4450K±3% | | | | | | |
|-----------------------------|-----------------|--------------|-------|----------------|---------|--|
| Temp | Resistance (KΩ) | | | % (Resist.tol) | | |
| °C | Rmax | R (t) Normal | Rmin | MAX (+) | MIN (-) | |
| 97 | 26.34 | 27.48 | 28.61 | 4.13 | 4.13 | |
| 98 | 25.45 | 26.56 | 27.68 | 4.20 | 4.20 | |
| 99 | 24.59 | 25.69 | 26.78 | 4.27 | 4.27 | |
| 100 | 23.76 | 24.84 | 25.91 | 4.33 | 4.33 | |
| 101 | 22.97 | 24.02 | 25.08 | 4.40 | 4.40 | |
| 102 | 22.20 | 23.24 | 24.28 | 4.47 | 4.47 | |
| 103 | 21.46 | 22.48 | 23.50 | 4.53 | 4.53 | |
| 104 | 20.75 | 21.75 | 22.75 | 4.60 | 4.60 | |
| 105 | 20.07 | 21.05 | 22.03 | 4.67 | 4.67 | |
| 106 | 19.41 | 20.37 | 21.34 | 4.73 | 4.73 | |
| 107 | 18.77 | 19.72 | 20.67 | 4.80 | 4.80 | |
| 108 | 18.16 | 19.09 | 20.02 | 4.87 | 4.87 | |
| 109 | 17.57 | 18.49 | 19.40 | 4.93 | 4.93 | |
| 110 | 17.01 | 17.90 | 18.80 | 5.00 | 5.00 | |
| 111 | 16.46 | 17.34 | 18.22 | 5.07 | 5.07 | |
| 112 | 15.93 | 16.79 | 17.66 | 5.13 | 5.13 | |
| 113 | 15.42 | 16.27 | 17.11 | 5.20 | 5.20 | |
| 114 | 14.93 | 15.76 | 16.59 | 5.27 | 5.27 | |
| 115 | 14.46 | 15.28 | 16.09 | 5.33 | 5.33 | |
| 116 | 14.01 | 14.80 | 15.60 | 5.40 | 5.40 | |
| 117 | 13.57 | 14.35 | 15.13 | 5.47 | 5.47 | |
| 118 | 13.14 | 13.91 | 14.68 | 5.53 | 5.53 | |
| 119 | 12.73 | 13.49 | 14.24 | 5.60 | 5.60 | |
| 120 | 12.34 | 13.08 | 13.82 | 5.67 | 5.67 | |
| 121 | 11.96 | 12.69 | 13.41 | 5.73 | 5.73 | |
| 122 | 11.59 | 12.31 | 13.02 | 5.80 | 5.80 | |
| 123 | 11.24 | 11.94 | 12.64 | 5.87 | 5.87 | |
| 124 | 10.90 | 11.58 | 12.27 | 5.93 | 5.93 | |
| 125 | 10.57 | 11.24 | 11.92 | 6.00 | 6.00 | |
| 126 | 10.25 | 10.91 | 11.57 | 6.07 | 6.07 | |
| 127 | 9.94 | 10.59 | 11.24 | 6.13 | 6.13 | |
| 128 | 9.65 | 10.29 | 10.92 | 6.20 | 6.20 | |
| 129 | 9.36 | 9.99 | 10.61 | 6.27 | 6.27 | |
| 130 | 9.09 | 9.70 | 10.32 | 6.33 | 6.33 | |
| 131 | 8.82 | 9.43 | 10.03 | 6.40 | 6.40 | |
| 132 | 8.57 | 9.16 | 9.75 | 6.47 | 6.47 | |
| 133 | 8.32 | 8.90 | 9.48 | 6.53 | 6.53 | |
| 134 | 8.08 | 8.65 | 9.22 | 6.60 | 6.60 | |
| 135 | 7.85 | 8.41 | 8.97 | 6.67 | 6.67 | |
| 136 | 7.63 | 8.18 | 8.73 | 6.73 | 6.73 | |
| 137 | 7.42 | 7.96 | 8.50 | 6.80 | 6.80 | |
| 138 | 7.21 | 7.74 | 8.27 | 6.87 | 6.87 | |
| 139 | 7.01 | 7.53 | 8.06 | 6.93 | 6.93 | |
| 140 | 6.82 | 7.33 | 7.85 | 7.00 | 7.00 | |





Enthalpy-humidity chart





WARNING :

The design and specifications are subject to change without prior notice for product improvement. Consult with the sales agency or manufacturer for details.

ATTENTION :

Le design et les données techniques sont donnés à titre indicatif et peuvent être modifiés sans préavis.



20.AW.YCV.8-18kW.R410A.SM.EN.05.16.Rev01