

A pair of hands gently cupping a small, realistic model of the Earth. The Earth shows continents and oceans. The background is a soft-focus green field with sunlight filtering through, creating a bokeh effect.

## 1. Advantages of Midea R290 Products

## Major advantages



Environmental



Secure and Reliable



Mass production is  
recognized by the market

## Environmental

| Refrigerant | ODP | GWP      | Relative charge | Ratio of CO2 emission |
|-------------|-----|----------|-----------------|-----------------------|
| R410A       | 0   | 2088     | 1               | 100%                  |
| R290        | 0   | <b>3</b> | <b>0.61</b>     | <b>0.6%</b>           |

Compared with refrigerant R410A, R290 features a GWP of only 3, so it essentially causes no greenhouse effect or damage to the ozone layer. Because of the higher performance of R290, the charge volume is 61% of R410. It is regarded as a really low-carbon and environmental refrigerant, and it is also widely favored by the international community.

## Secure and Reliable



### Product safety protection

Optimization of parts and components

Comparison of the weights of compressors



### Safety

Electrolyte injection test

Incendiary agent test

Heating wire burning test



# Optimization of products—parts and components

R134a/R410a



Smaller size

R290



Bigger size

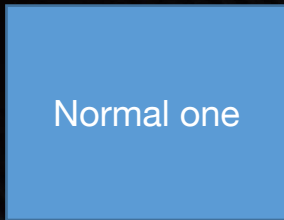
## Comparison of the weights of compressors

| Model                           | Refrigerant charge / g | Weight of R290 compressor (KG) | Weight of R410A compressor (KG) | Weight difference (new – old) |
|---------------------------------|------------------------|--------------------------------|---------------------------------|-------------------------------|
| PHA5K                           | 90                     | 9.1                            | 7.5                             | <b>1.6</b>                    |
| PH8K                            | 150                    | 10.6                           | 8.8                             | <b>1.8</b>                    |
| PH9K                            | 170                    | 10.6                           | 8.8                             | <b>1.8</b>                    |
| PD9K                            | 200                    | 11.5                           | 8.8                             | <b>2.7</b>                    |
| PD12K cooling only model        | 220                    | 12.1                           | 11.5                            | <b>0.6</b>                    |
| PD12K cooling and heating model | 230                    | 12.1                           | 11.5                            | <b>0.6</b>                    |

# Optimization of products—parts and components

| parts           | R134a/R410a                                                                                         | NEW R290                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| E-BOX enclosure | Not sealed<br>    | Sealed<br>          |
| Sealing method  | Flame welding<br> | Lokring Sealing<br> |

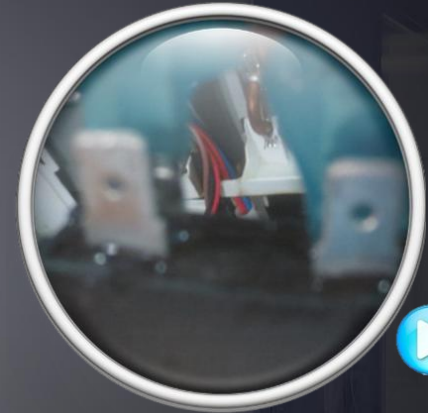
# Optimization of products–parts and components

| parts              | R134a/R410a                                                                                                        | NEW R290                                                                                                                |
|--------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Water level sensor | <p>Normal One</p>  <p>R-410A</p> | <p>Explosion Proof</p>  <p>R-290</p> |
| Fuse               |  <p>Normal one</p>               | <p>Explosion Proof Ceramic Fuse</p>  |



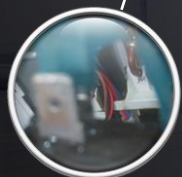
# Safety – electrolyte injection test

Electrolyte injection tests have been carried out for strong-current parts, such as the compressor capacitor and motor capacitor port



1. The 1st electrolyte injection, the machine does not react;
2. The 2nd electrolyte injection, arc discharge produces a hissing sound.
3. The 3rd electrolyte injection, the hissing sound of the arc discharge gradually fades.

After the test, it is found that only arc discharge occurs in the small interior space of the capacitor cover, while no fire is found. Moreover, the capacitor pin is damaged by arc discharge and there is sign of arc discharge on the inner wall of the rubber capacitor cover.



fan motor capacitor  
(strong current)



Fireproof rubber  
cover that covers  
the capacitor



Injection trigger

# Safety – incendiary agent test

Incendiary agent tests have been carried out for strong-current parts, such as the compressor capacitor and motor capacitor port.

**Step1**



Wind electric heating wire on the fan motor capacitor (strong current) terminal

**Step2**



Apply solid alcohol on the fan motor capacitor (strong current) terminal

**Step3**



Cover the fan motor capacitor with the fireproof rubber cover

**Step4**



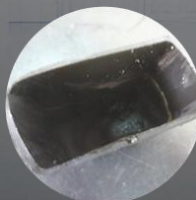
The electric heating wire to burn the alcohol during this process, there is smoke, but no open fire.

Before

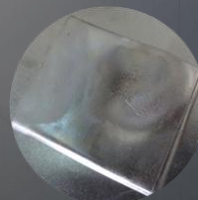
After



After disassembling the machine, it is found that the fireproof rubber cover Appearance is OK.



The interior of the rubber cover is scorched and blackened



The fireproof rubber cover suffers dimensional deformation, but is generally in good condition.

# Safety – heating wire burning test

Heating wire burning tests have been carried out for strong-current parts, such as the compressor capacitor and motor capacitor port

| Current of electric heating wire | Time | Phenomenon                                                        |
|----------------------------------|------|-------------------------------------------------------------------|
| 2A                               | 2m   | No significant change                                             |
| 4A                               | 2m   | No significant change                                             |
| 6A                               | 2m   | No significant change                                             |
| 8A                               | 2m   | No significant change                                             |
| 10A                              | 2m   | Slight white smoke                                                |
| 12A                              | 2m   | White smoke for 21 minutes, no open fire and no ignition of gauze |

Before

**Step1**



Wind electric heating wire on the fan motor capacitor (strong current) terminal

**Step2**



Cover the fan motor capacitor with the fireproof rubber cover

**Step3**



Cover the machine with a piece of incandescence gauze

After



The fireproof rubber cover suffers dimensional deformation, a little damage.



The capacitor is damaged by high temperature seriously.



There is smoke. But the piece of incandescence gauze is not fired.

# Mass production is recognized by the market

By April 2018, **43,400** units of dehumidifiers and portable air conditioners with R290 had been sold.

This indicates that the refrigerant R290 technology boasts proven application and market recognition.

| Code           | Number                 | Sales volume<br>(number of units) |
|----------------|------------------------|-----------------------------------|
| 22020610000114 | EU-KC30Y1/N7-PD(C1)-G1 | 6,169                             |
| 22020610000576 | EU-KC26Y1/N7-PFB(C1)   | 525                               |
| 22020610000577 | EU-KC32Y1/N7-PFB(B6)   | 13,736                            |
| 22020610000716 | EU-KC41Y1/N7-PB(B6)    | 3,899                             |
| 22020610000836 | ELEU-KCR26Y1/N7-PE(C1) | 3,646                             |
| 22020610001056 | EU-KC26Y1/N7-PFA(B6)   | 3,646                             |
| Total          |                        | 43,400                            |