MS-100 Digital Manifold Gauge
User Manual



English

1 Product Description

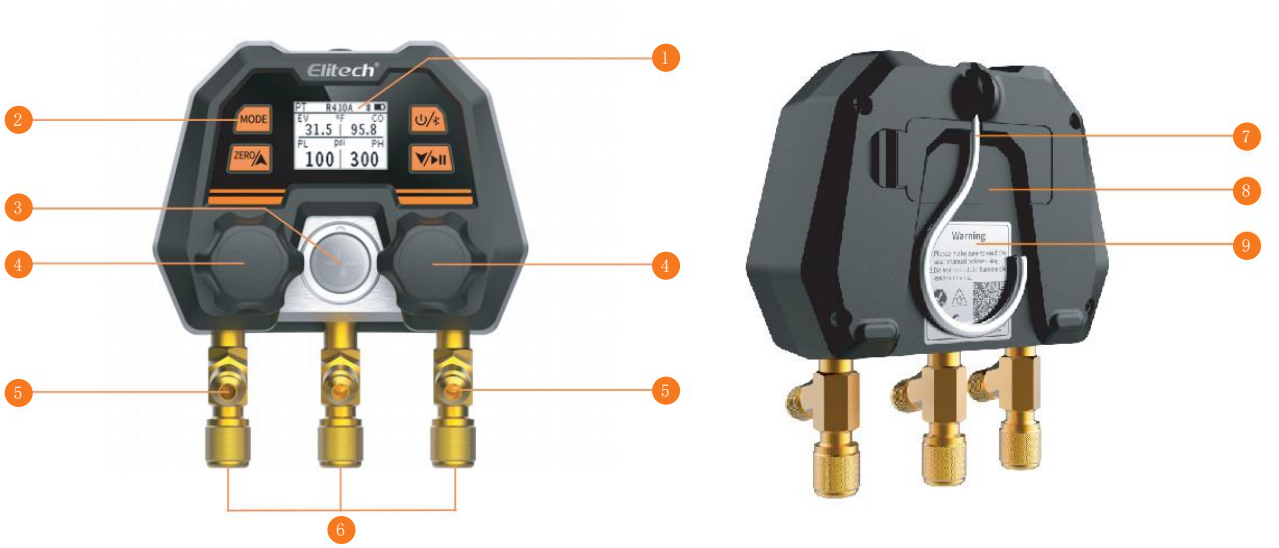
1.1 Introduction

You are welcome to purchase **Elitech MS** series digital manifold gauges .Please read this manual carefully before use to avoid harm to you and your products caused by illegal operations.

MS-100 series digital manifold gauge integrates pressure temperature mode, pressure holding mode, vacuum mode and data recording mode into one. It is suitable for daily inspection and maintenance of refrigeration and heating ventilation systems to help users provide more real and accurate data, greatly improve the user's on-site work efficiency, and can completely replace the existing mechanical meter valves. At the same time, it supports APP to view reports and data analysis, real-time update of commonly used refrigerants, and remote firmware upgrades to continuously improve product user experience.

Note: The pressure holding mode, vacuum mode, and data recording mode need to be used after purchasing a package through the APP. For the purchase method, see 4.4 of this article

1.2 Overview



1. LCD screen
2. Control buttons (see 1.5 for button functions)
3. Sight glass
4. Valve knob
5. Refrigerant pipe bracket
6. Refrigerant pipe connection port (1/4SAE)
7. Suspension device
8. Battery compartment (2 AAA batteries, batteries can be replaced)
9. Information label

1.3 Safety Instructions

1. This product is not suitable for the maintenance of ammonia (ammonia-containing) refrigerant system.
2. This product contains a battery inside. Do not place the product in a high-temperature environment or put it in a fire, otherwise there is a danger of explosion.
3. Do not use this product in thunderstorm weather, so as not to be struck by lightning, endanger life and damage the product.
4. Strictly abide by the safety precautions of the refrigeration system.
5. When using this product, please wear goggles and protective gloves. Before connecting to the system, carefully read the maintenance manual of the system unit for maintenance operations.
6. If you find that the product is damaged, please contact us in time. It is strictly forbidden to disassemble the product without permission, otherwise the product may be further damaged, and the battery may catch fire or even explode in serious cases.

1.4 Environmental Protection

1. Comply with the local environmental protection policy. Refrigerants cannot be directly discharged into the atmosphere, and professional equipment must be used for recycling.

2. At the end of the service life of the product, please recycle it according to local regulations, and do not discard it at will to avoid environmental pollution.
3. Send the scrapped old battery to the specified waste battery collection point.

1.5 Key Functions

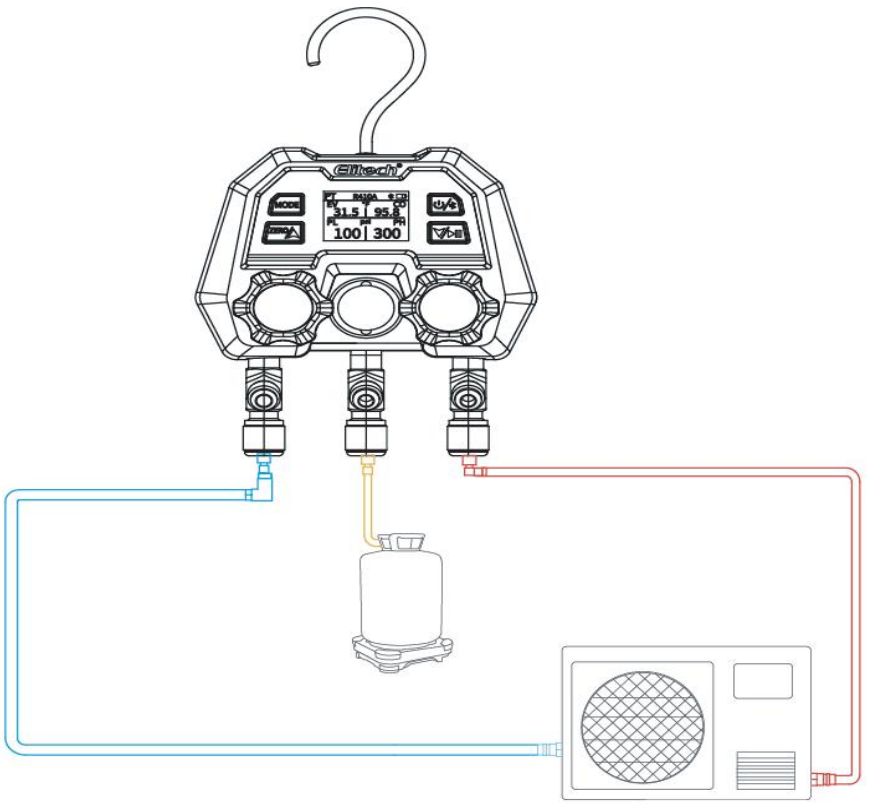
	1.Long press: power on/off 2.Short press: turn on/off Bluetooth
	1.Long press: enter the setting interface 2.Short press: switch the setting options in the setting interface
	1.Short press: switch refrigerant type 2.Long press: data zero calibration , (air pressure zero calibration range: 1-100psi)
	1. Short press: ①Switch the type of refrigerant ②The holding pressure interface opens the holding pressure state 2. Long press: ①The pressure holding interface ends the pressure holding state ② Exit the display interface of the holding pressure data result
 and  simultaneously press	Switch measurement mode
 and  simultaneously press	Press and hold for 3 seconds to unlock and select the refrigerant state Note: After unlocking, the refrigerant starts to flash, at this time, the refrigerant can be switched, and the refrigerant is automatically locked after 10 seconds

1.6 Specifications

Characteristic	Parameter
Pressure Range	-14~800psi
Accuracy	±1% FS
Resolution	1psi
Unit	Pressure: psi, kPa, MPa, bar, inHg, kg/cm2 Temperature: °C,°F
Refrigerant Type	The device defaults to 18 types, which can be updated through the APP
Alternative Refrigerants	Device default type: R11 R12 R13 R22 R290 R32 R134a R404A R410A R407C R408A R409A R458A R448A R449A R500 R502 R600 App support types: R11 R113 R114 R115 R116 R12 R123 R1233zd R1234yf R1234ze R124 R125 R13 R134a R14 R141b R142b R143a R152a R161 R170 R21 R218 R22 R227EA R236EA R23 R290 R32 R40 R236fa R245fa R401A R401B R401C R402A R402B R403A R403B R404A R405A R406A R407A R407B R407C R407D R407E R407F R408A R409A R409B R41 R410A R410B R411A R411B R412A R413A R414A R414B R415A R415B R416A R417A R417B R417C R419A R419B R420A R421A R421B R422A R422B R422C R422D R422E R423A R424A R425A R426A R427A R428A R429A R430A R431A R432A R433A R433B R433C R434A R435A R436A R436B R437A R438A R439A R440A R441A R442A R443A R444A R444B R445A R446A R447A R448A R449A R449B R450A R451A R451B R452A R452B R452C R453A R454A R454B R454C R455A R456A R457A R458A R50 R500 R502 R503 R504 R507A R508A R508B R509A R510A R512A R514A R600 R600a R601 R601a R717 R718 R720 R728 R732 R740 R744 Note: The actual supported refrigerant types are subject to APP
Interface	1/4 SAE*3
Power Supply	2 x 1.5V, AAA batteries Battery life: 200H (display with screen backlight off)

Display	LCD screen
Product Parameters	Size: 110 x 75 x 135mm Weight: about 700g
Environmental Requirements	Working temperature: 14~122 ℉ /-10~50 ℃ Storage temperature: -4~140 ℉ /-20~60 ℃
Supported Languages	English,Chinese

2 Quick Operation Guide



1.Long press the power button to turn on the device.
2.Enter the pressure and temperature measurement interface, press ZERO and at the same time ▽/II for 3 seconds to unlock the refrigerant.
3.The refrigerant flashes, short press ZERO or ▽/II select the desired refrigerant.
4.Connect the high and low voltage sides of the product to the system under test.
5.Turn on the system under test, and at this time, the system pressure and saturation temperature parameters can be monitored in real time.

3 Operation Steps

3.1 Measurement Preparation

1. Press the power button to turn on the device and enter the main interface.
2. Calibrate the pressure sensor to zero (long press ZERO to zero).

Perform zero calibration of the pressure sensor before each measurement (zero calibration range: 1-100psi) .
Before zeroing, be sure to cut off the connection of the instrument with any pressure source, and keep it balanced with the external pressure.

3. Connect the refrigerant hose.

The low-pressure end refrigerant pipe (blue) and the high-pressure end refrigerant pipe (red) are respectively connected to the instrument and connected to the system under test.

4. Set the refrigerant, (long press ZERO + ▽▷II unlock, then short press ZERO or ▽▷II switch the refrigerant type).

3.2 Pressure Temperature Measurement Mode(PT)

After the refrigerant setting is completed, read the system data, and the interface (Figure 1) displays the measured pressure value, evaporation temperature value and condensation temperature value of the high and low pressure sides.

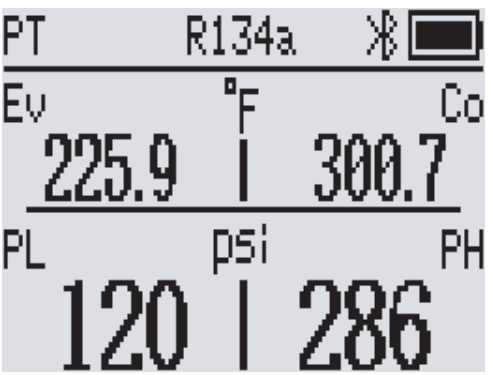


Figure 1 Pressure temperature mode

3.3 Pressure Holding Measurement Mode(HOLD)

Note: This function needs to be purchased before it can be used, and the purchase method is detailed in 4.4 of this article.

1.Connect the high-pressure side refrigerant hose to the system under test, and close the high-pressure valve.

The high-voltage side channel is the system pressure-holding test terminal.

2.**Enter the holding pressure test** : press the MODE and ▽/▷II button at the same time , the upper left corner of the window displays **HOLD** (Figure 2).

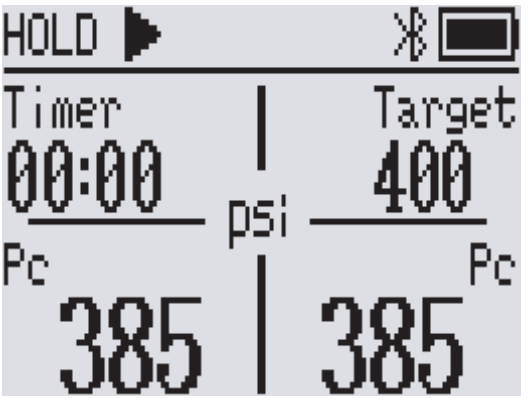


Figure 2 Enter the holding pressure test interface

3.**Set the pressure holding parameters** :

Pressure alarm value: When the current pressure value reaches the target pressure holding value, the device will alarm, and the pressure holding can be started at this time.
Decay ratio: adjust the decay ratio, and set the pre-warning value .
Temperature Compensation: Turn on/off the temperature compensation switch.
Pressure hold time: set the hold time.

The parameters of this step need to be connected to the APP for setting

4.**System charging** : Fill the system with nitrogen. When the pressure reaches the charging warning value, **Target** area of the device will start to flash and a prompt will sound at the same time.

Short press any button to turn off the prompt sound

5.**Start leak test** : click after the device reaches the pressure warning value to start the leak test , and the timer starts counting down (Figure 3) .

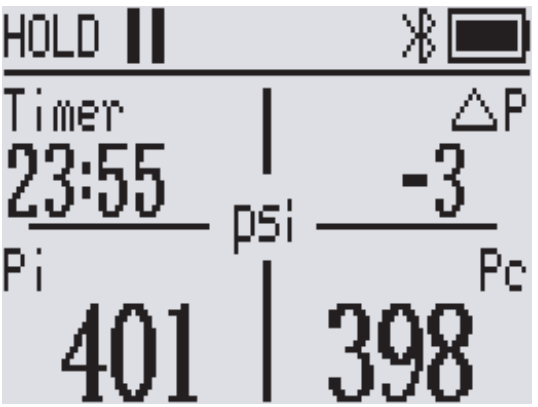


Figure 3 Pressure hold start interface

6.**To end the leak test** :
The test is successful: After the test is successful, the device emits a beep and jumps to the successful result display interface (Figure 4).
Test failure: After the test fails, the device emits a beep and jumps to the failure result display interface (Figure 5).
Forced to end the test: press and hold the button to forcibly exit the leak test and jump to the result display interface (Figure 6)



Figure 4 Test success interface



Figure 5 Test failure interface



Figure 6 Test result display interface

7.**Exit the test result interface**: long press the button.

Tip: The instrument has a built-in temperature compensation function, which can perform the air tightness test of the compression system. Leak analysis is performed by measuring system pressure and ambient temperature over a period of time . If the temperature compensation function is not required, it can be turned off in the settings.

3.4 Vacuum Measurement Mode(VAC)

Note: This function needs to be purchased before it can be used, and the purchase method is detailed in 4.4 of this article.

1. Connect the system to the high pressure side and open the high pressure side valve.

The high-voltage side channel is the vacuum test port of the system.

2.Enter the vacuum mode: press the MODE and button at the same time , the upper left corner of the window will display **VAC**.
3. The product is connected to the vacuum pump and the system under test.
4. Turn on the vacuum pump to extract the pressure in the system.

When the pressure in the system is lower than the atmospheric pressure (that is, the pressure display is less than 0), it will display the vacuum degree of the system, otherwise it will display - - - -.

5.The interface (Fig. 7) displays the current pressure value of the system, the vacuum degree of the system and the timing of entering this interface.

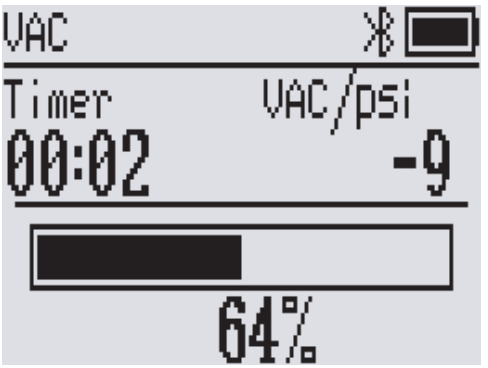


Figure 7 Vacuum test interface

Tips: This vacuuming function uses a non-professional vacuum sensor, which can only be used to roughly observe the vacuum state of the system. If you want to accurately measure the vacuum value of the system, please contact our after-sales service to purchase a professional vacuum gauge .

3.5 Offline Recording Mode

The offline recording mode can store data in the device without Bluetooth connection, and then export it for viewing through the APP.
Note: This function needs to be purchased before it can be used, and the purchase method is detailed in 4.4 of this article.
1.Connect the device to the APP and enter **Dashboard** interface.
2.Click **Settings** , click **Record Function** .
3.**Recording Interval** : Click Record Interval to select the interval time.
4.**Start recording** : Click to **Recording** , the recording icon on the device lights up and starts to flash (Figure 8).

The device can record up to 3000 pieces of data.

5.**End recording** : Click to **Log off** , and the recording icon on the device goes out.
6.**Data reading** : Click **Read historical data** and export the data.
7.**Data deletion** : Click **Clear historical data** .

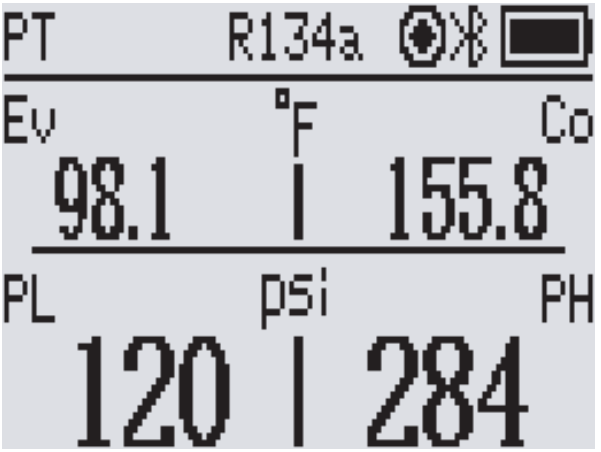


Figure 8 Data record icon

3.6 Setup Mode

Enter the settings : press MODE and hold , the upper left corner of the window will display **SET** (Figure 9)

Switch settings : short press MODE

Select setting items : short press ZERO or ▽/▷II

Exit settings : long press MODE

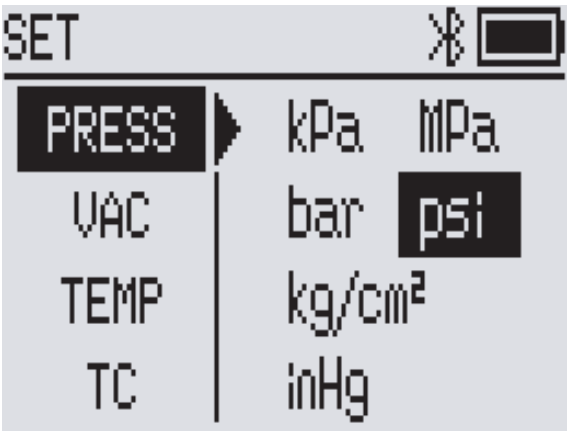


Figure 9 Setting interface diagram

3.6.1 Unit setting

pressure unit

1. Go to Settings and select **PRESS** .

2. Short press  or  to select the pressure unit.

Vacuum Unit

1. Go to Settings and select **VAC** .
2. Short press  or  select the vacuum unit .

Temperature Unit

1. Go to Settings and select **TEMP** .
2. Short press  or  to switch temperature units.

3.6.2 Automatic Shutdown Setting

1. Go to Settings and select **AUTOOFF** .

The default automatic shutdown time is 15 minutes.

2. Short press  or  select the automatic shutdown time (OFF, 5, 15, 30, 60min)

OFF means turn off the auto power off function.

3.6.3 Language Settings

Go to settings, select **LANG**.

3.6.4 Temperature Compensation Setting

1. Go to Settings and select **TC** .
2. Turn on/off the temperature compensation function.

The temperature compensation function is enabled by default.

3.6.5 About

1. Go to Settings and select **ABOUT** .
2. Check the software version number, SN serial number and MAC code.
3. Short press the  or  key to view the SN serial number and APP download QR code.

4 Smart Apps

The DMG series supports Bluetooth wireless connection, and can experience remote viewing of measurement data, recording and exporting data reports, remote firmware upgrades, pressure maintenance alarm reminders and other intelligent functions through the mobile APP.

4.1 APP download

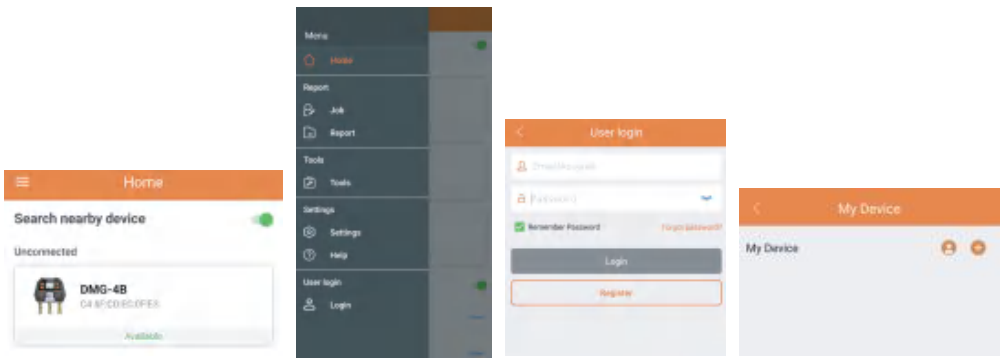
1."**Elitech Tools**" in the "APP Store" .
2. Android users: Search "**Elitech Tools**" in "Google Play"
3. Scan the QR code to get the APP.
Compatibility: Apple system supports version 11.0 and above, and Android system supports version 5.0 and above.

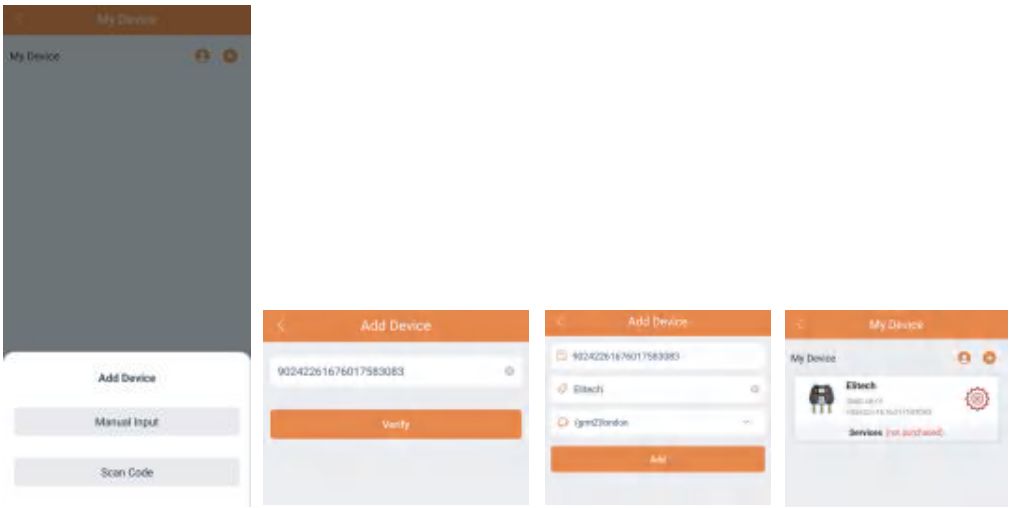
4.2 APP connection

1. Turn on the product, press , and the Bluetooth icon will flash
2. Open "**Elitech Tools**" , click "**Search nearby device**", connect the product, and enter the interface to view the data.

4.3 User registration

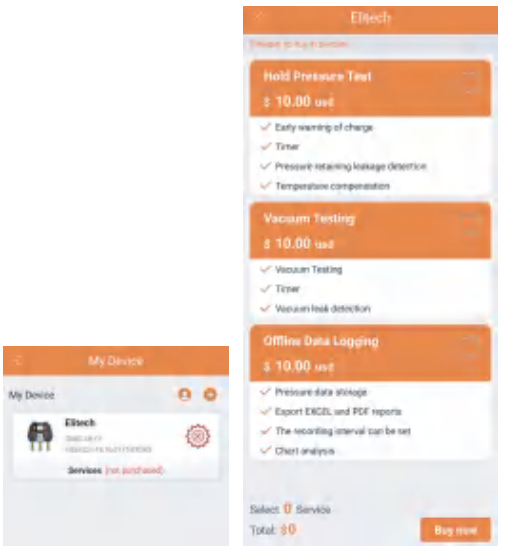
1. Open the "**Elitech Tools**" APP, and click the icon in the upper left corner of the Home.
2. Enter the **Menu** and click **Login** .
3. Select **Register** to register user information.
4. After the registration is complete, click Add Device on the **My Device**.
5. Manually enter the SN serial code on the information label on the back of the product or scan the QR code to add the device.
Note: If the information label is lost or damaged, please go to Device **SET →ABOUT** to check the serial number.





4.4 Value-Added Services

How to purchase value-added services:
Method 1: Log in the user information, enter My Device page, click the  to add devices, and click the device list to purchase items.



Method 2: Connect the device via Bluetooth, enter the **Dashboard** interface, click **Settings**, and purchase items in the settings list.

4.5 Personalization of Refrigerant Data

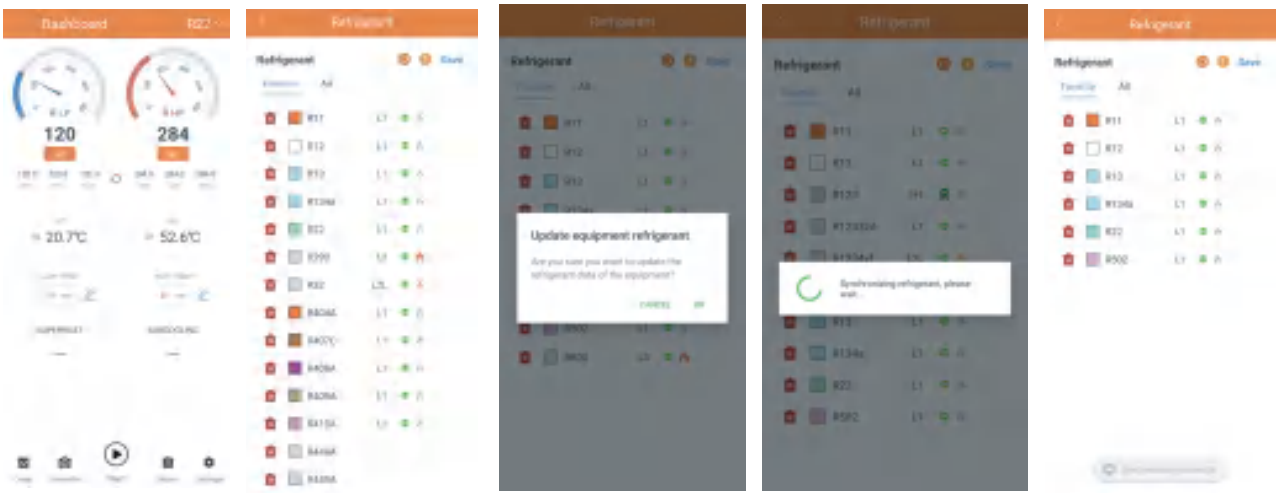
The device defaults to 18 commonly used refrigerants, and customized refrigerant data can be added to the device through the APP. The specific operation steps are as follows:

Delete equipment refrigerant:

1.Connect the device to the APP, enter the **Dashboard** interface, and click the refrigerant icon in the upper right corner to enter the **Refrigerant** interface.

2.Select the refrigerant to be deleted, click the delete icon, and click the update icon in the upper right corner after deleting.

3.The device update is complete.



Add refrigerant:

1.Connect the device to the APP, enter the **Dashboard** interface, and click the refrigerant icon in the upper right corner to enter the **Refrigerant** interface.

2.Click All , select the refrigerant to be added, and click the favorite icon.

3.After selecting, click **Favorite**, and then click the update icon.

4.The device update is complete.

4.6 Firmware Update

The device can perform remote firmware upgrade through the APP, the operation steps are as follows:

1.Connect the device to the APP and enter the **Dashboard** interface.

2.Click **Settings** and select **Update Firmware** .

3.If the latest firmware needs to be upgraded, the device will enter the upgrade process , and the interface will show that **Update...** (Figure 10).

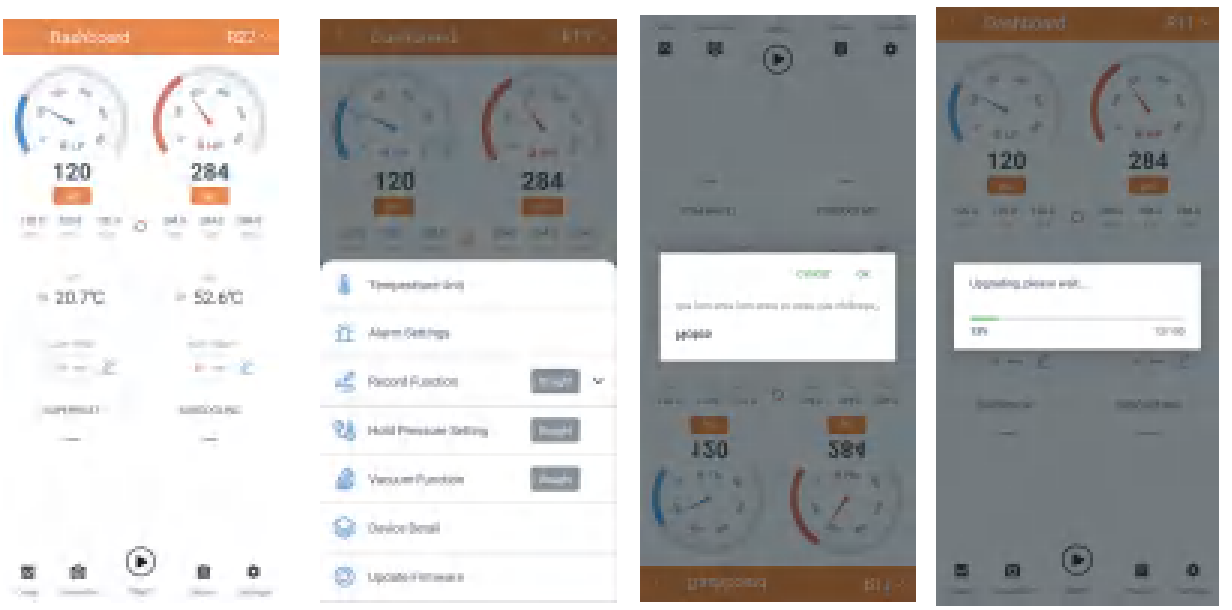




Figure 10 Device firmware upgrade

5 Instrument Maintenance

5.1 Replacing the Battery

1.Turn off the instrument and remove the battery cover.
2.Remove the low battery and install a new battery in the battery compartment.
❗The battery type is 2 AAA batteries, pay attention to the polarity of the batteries.
3.Install the battery cover.
❗Please take out the battery when storing or not using the product for a long time to avoid battery leakage and corrosion of the product.

5.2 Cleaning Products

1.If the case of the instrument is dirty, please clean it with a damp cloth
❗Do not use strong corrosive detergents or solvents to clean the product
2.Keep the threaded interface of the refrigerant hose clean and free from grease and other deposits .

5.3 Problems and Solutions

question	possible reason	Solution
battery indicator flashing	low battery	replace with new battery
Device automatically shuts down	1.The device has auto-shutdown enabled 2.Battery is dead	1.Turn off the auto power off function 2.Replace with new battery
Saturation temperature display area shows - - - -	Saturation temperature exceeds the allowable range	Keep within the allowable range
Pressure display area shows - OL -	The pressure exceeds the allowable range	Keep within the allowable range

5.4 Packaging Accessories

Product Host*1
Tool kit*1
Manual*1
Packing box*1