

MS-100 Digital Manifold Gauge User Manual



1 Product Description

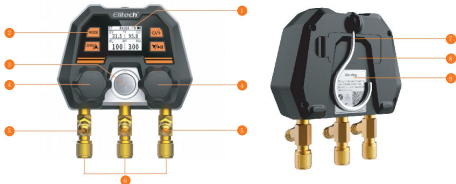
1.1 Introduction

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.

① 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

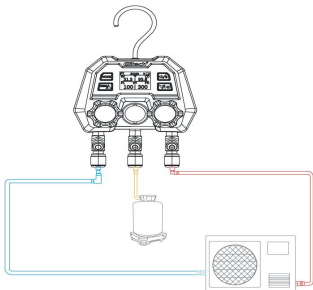
	1.Long press: power on/off 2.Short press: turn on/off Bluetooth
	1.Long press: enter the setting interface 2.Short press: switch the setting options in the setting interface
	1.Short press: switch refrigerant type 2.Long press: data zero calibration , (air pressure zero calibration range: 1-100psi)
	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: <table><tr><td>R11</td><td>R12</td><td>R13</td><td>R22</td><td>R290</td><td>R32</td><td>R134a</td><td>R404A</td></tr><tr><td>R410A</td><td>R407C</td><td>R408A</td><td>R409A</td><td>R458A</td><td>R448A</td><td>R449A</td><td>R500</td></tr><tr><td>R502</td><td>R600</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> App support types: <table><tr><td>R11</td><td>R113</td><td>R114</td><td>R115</td><td>R116</td><td>R12</td><td>R123</td><td>R1233zd</td></tr><tr><td>R1234yf</td><td>R1234ze</td><td>R124</td><td>R125</td><td>R13</td><td>R134a</td><td>R14</td><td>R141b</td></tr><tr><td>R142b</td><td>R143a</td><td>R152a</td><td>R161</td><td>R170</td><td>R21</td><td>R218</td><td>R22</td></tr><tr><td>R227EA</td><td>R236EA</td><td>R23</td><td>R290</td><td>R32</td><td>R40</td><td>R236fa</td><td>R245fa</td></tr><tr><td>R401A</td><td>R401B</td><td>R401C</td><td>R402A</td><td>R402B</td><td>R403A</td><td>R403B</td><td>R404A</td></tr><tr><td>R405A</td><td>R406A</td><td>R407A</td><td>R407B</td><td>R407C</td><td>R407D</td><td>R407E</td><td>R407F</td></tr><tr><td>R408A</td><td>R409A</td><td>R409B</td><td>R41</td><td>R410A</td><td>R410B</td><td>R411A</td><td>R411B</td></tr><tr><td>R412A</td><td>R413A</td><td>R414A</td><td>R414B</td><td>R415A</td><td>R415B</td><td>R416A</td><td>R417A</td></tr><tr><td>R417B</td><td>R417C</td><td>R419A</td><td>R419B</td><td>R420A</td><td>R421A</td><td>R421B</td><td>R422A</td></tr><tr><td>R422B</td><td>R422C</td><td>R422D</td><td>R422E</td><td>R423A</td><td>R424A</td><td>R425A</td><td>R426A</td></tr><tr><td>R427A</td><td>R428A</td><td>R429A</td><td>R430A</td><td>R431A</td><td>R432A</td><td>R433A</td><td>R433B</td></tr><tr><td>R433C</td><td>R434A</td><td>R435A</td><td>R436A</td><td>R436B</td><td>R437A</td><td>R438A</td><td>R439A</td></tr><tr><td>R440A</td><td>R441A</td><td>R442A</td><td>R443A</td><td>R444A</td><td>R444B</td><td>R445A</td><td>R446A</td></tr><tr><td>R447A</td><td>R448A</td><td>R449A</td><td>R449B</td><td>R450A</td><td>R451A</td><td>R451B</td><td>R452A</td></tr><tr><td>R452B</td><td>R452C</td><td>R453A</td><td>R454A</td><td>R454B</td><td>R454C</td><td>R455A</td><td>R456A</td></tr><tr><td>R457A</td><td>R458A</td><td>R50</td><td>R500</td><td>R502</td><td>R503</td><td>R504</td><td>R507A</td></tr><tr><td>R508A</td><td>R508B</td><td>R509A</td><td>R510A</td><td>R512A</td><td>R514A</td><td>R600</td><td>R600a</td></tr><tr><td>R601</td><td>R601a</td><td>R717</td><td>R718</td><td>R720</td><td>R728</td><td>R732</td><td>R740</td></tr><tr><td>R744</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Note: The actual supported refrigerant types are subject to APP	R11	R12	R13	R22	R290	R32	R134a	R404A	R410A	R407C	R408A	R409A	R458A	R448A	R449A	R500	R502	R600							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							
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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  and at the same time  for 3 seconds to unlock the refrigerant.
3. The refrigerant flashes, short press  or  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  to zero).

❶ Perform zero calibration of the pressure sensor before each measurement (zero calibration range: 1-100psi) .

❷ 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.

❸ 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  +  unlock, then short press  or  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.

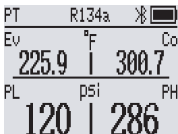


Figure 1 Pressure temperature mode

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.

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

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

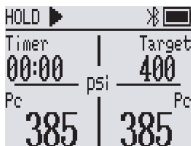


Figure 2 Enter the holding pressure test interface

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.

❶ 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.

❶ 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) .

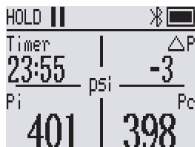


Figure 3 Pressure hold start interface

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)

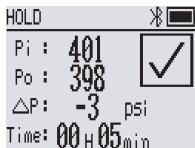


Figure 4 Test success interface

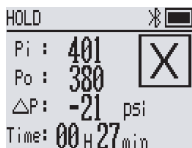


Figure 5 Test failure interface

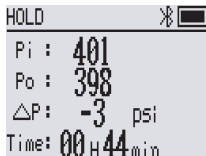


Figure 6 Test result display interface

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.

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

2. Enter the vacuum mode: press the  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.

❶ 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.

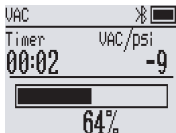


Figure 7 Vacuum test interface

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) .

❶ 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** .

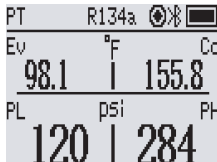


Figure 8 Data record icon

3.6 Setup Mode

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

Switch settings : short press 

Select setting items : short press  or 

Exit settings : long press 



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**.

❶ The default automatic shutdown time is 15 minutes.

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

❶ **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.

❶ 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.

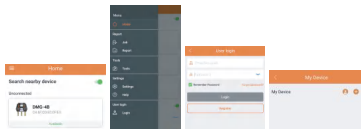
4.2 APP connection

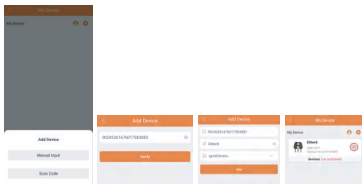
1. Turn on the product, press , and the Bluetooth icon will flash
2. Open "**Elitech Tools**", click "**Search nearby device**", connect the product, and enter the interface to view the data.

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.

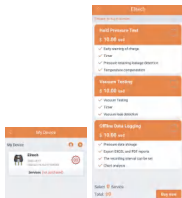




4.4 Value-Added Services

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.



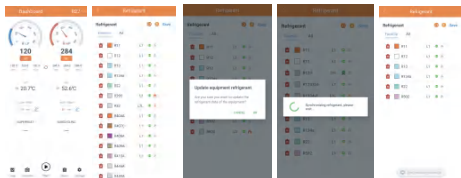
Method 2: Connect the device via Bluetooth, enter the **Dashboard** interface, click **Settings**, and purchase items in the settings list.

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) .

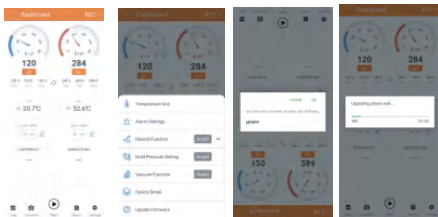


Figure 10 Device firmware upgrade

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.
❶ The battery type is 2 AAA batteries, pay attention to the polarity of the batteries.
3. Install the battery cover.
❶ 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
❶ 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