

Copyright Information

Copyright © 2021 by SHENZHEN SMARTSAFE TECH CO.,LTD. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of SMARTSAFE.

Neither SMARTSAFE nor its affiliates shall be liable to the purchaser of this unit or third parties for damages, losses, costs, or expenses incurred by purchaser or third parties as a result of: Accident, misuse, or abuse of this unit, or unauthorized modifications, repairs, or alterations to this unit, or failure to strictly comply with SMARTSAFE operating and maintenance instructions. SMARTSAFE shall not be liable for any damages or problems arising from the use of any options or any consumable products other than those designated as Original SMARTSAFE Products or SMARTSAFE Approved Products by SMARTSAFE.

All information, specifications and illustrations in this manual are based on the latest information available at the time of printing. SMARTSAFE reserves the right to make changes at any time without prior written or oral notice.

Trademark Information

SmartSafe is a registered trademark of SHENZHEN SMARTSAFE TECH CO.,LTD. in China and other countries. All other SMARTSAFE trademarks, service marks, domain names, logos, and company names referred to in this manual are either trademarks, registered trademarks, service marks, domain names, logos, company names of SMARTSAFE or are otherwise the property of SMARTSAFE or its affiliates. In countries where any of the SMARTSAFE trademarks, service marks, domain names, logos and company names are not registered, SMARTSAFE claims other rights associated with unregistered trademarks, service marks, domain names, logos, and company names. Other products or company names referred to in this manual may be trademarks of their respective owners. You may not use any trademark, service mark, domain name, logo, or company name of SMARTSAFE or any third party without permission from the owner of the applicable trademark, service mark, domain name, logo, or company name. You may contact SMARTSAFE by visiting the website at www.newsmartsafe.com, or writing to SHENZHEN SMARTSAFE TECH CO.,LTD., 3310, Building 11, Tianan Cloud Park, Bantian Street, Longgang District, Shenzhen, Guangdong, China, to request written permission to use Materials on this manual for purposes or for all other questions relating to this manual.

Table of Contents

1. Product Overview	1
1.1 Product Features	1
1.2 Main Function and Test Range	1
1.3 System Components	1
1.4 Working Conditions	1
2. Precautions for Safe Use	1
2.1 Safe Working Period & Production Date	1
2.2 General Rule	1
2.3 Common Incorrect Operation	1
2.4 Damage Probably Caused By Incorrect Operation	2
2.5 Emergency Treatment In Exceptional Cases	2
2.6 Precautions In Exceptional Circumstances	2
2.7 Other Safety Alerts	2
3. Technical Features	2
4. Operating Instructions	3
4.1 Panel Description	3
4.2 Tester Connection	3
4.3 Main Unit Operation	3
5. Transport & Storage	11
6. Environmental Protection and Others	12
Warranty	12

1. Product Overview

ET500 battery pack leak tester (LP) is the latest high-accuracy nondestructive testing equipment developed by Smartsafe. It mainly uses compressed air as the medium to apply specific pressure to the inner cavity or surface of the battery to be tested and then uses sensitive sensors to detect the variations of pressure to determine the leakage of the battery pack. It can improve customer testing efficiency and product quality with pollution-free, quick, and accurate testing characteristics in the new energy industry.

1.1 Product Features

- High sensitivity pressure sensing significantly improves test accuracy and stability.
- 7-inch touch screen visually displays the test progress and data.
- Display the progress time of each stage during the test.
- The pressure dial and the test curve will display on the same screen in real-time.
- The system automatically memorizes the last test parameters, which is convenient for the next test modification and improves efficiency.
- Parameters such as workpiece number, volume, pressure, time of each stage, leakage limit can be preset.
- The tester will prompt audible and visual alarms to ensure safety when the test is abnormal or failed.

1.2 Main Function and Test Range

Mainly used for the leakage test of battery packs.

1.3 System Components

The tester consists of main unit, AC power cord and air pipe.

The main unit includes display screen, data processing unit, data acquisition unit and panel operation unit.

1.4 Working Conditions

NO CORROSIVE, NO EXPLOSIVE, NO ELECTRICAL BREAKDOWN AIR OR CONDUCTIVE DUST.

2. Precautions for Safe Use

2.1 Safe Working Period & Production Date

The designed safe working period for this tester is 5 years, please refer to the factory inspection list for the production date.

2.2 General Rule

Please follow the user manual to use this tester.

2.3 Common Incorrect Operation

- 1) Tools for connecting is not well insulated.
- 2) Operating without following the user manual.

2.4 Damage Probably Caused By Incorrect Operation

- 1) Short circuit accident: Tools is not well insulated, or battery pack positive and negative electrodes are too close.
- 2) Failure to follow the correct operation method will cause the device not working properly.

2.5 Emergency Treatment In Exceptional Cases

Disconnect the tester power supply and test cables.

2.6 Precautions In Exceptional Circumstances

If the operator uses tools without well insulation or improper operate to cause short circuit, please separate the cables immediately.

2.7 Other Safety Alerts

Strict compliance with safety operating norms and correct operating procedure.

3. Technical Features

Parameter	Description
Model	ET500
Test Power	35W (Max)
Test Method	Pressure
Test Pressure Range	0~500Kpa
Sensor Resolution	1 Pa
Sensor Resolution	±5pa
Display	7-inch LCD touch screen
Communication Port	RS485 / USB
Data Storage	Internal memory/download via USB disk
Power Supply	AC 90~265V
Air Supply	0.1 ~ 1.0 Mpa dry compressed air
Air Inlet Port	φ6mm air pipe
Test Port	φ6mm air pipe
Work Temperature	-10 ~ 55°C
Work Humidity	10% ~ 90% @25°C, without condensation
Dimension	281*281*370mm
Weight	7.2kg

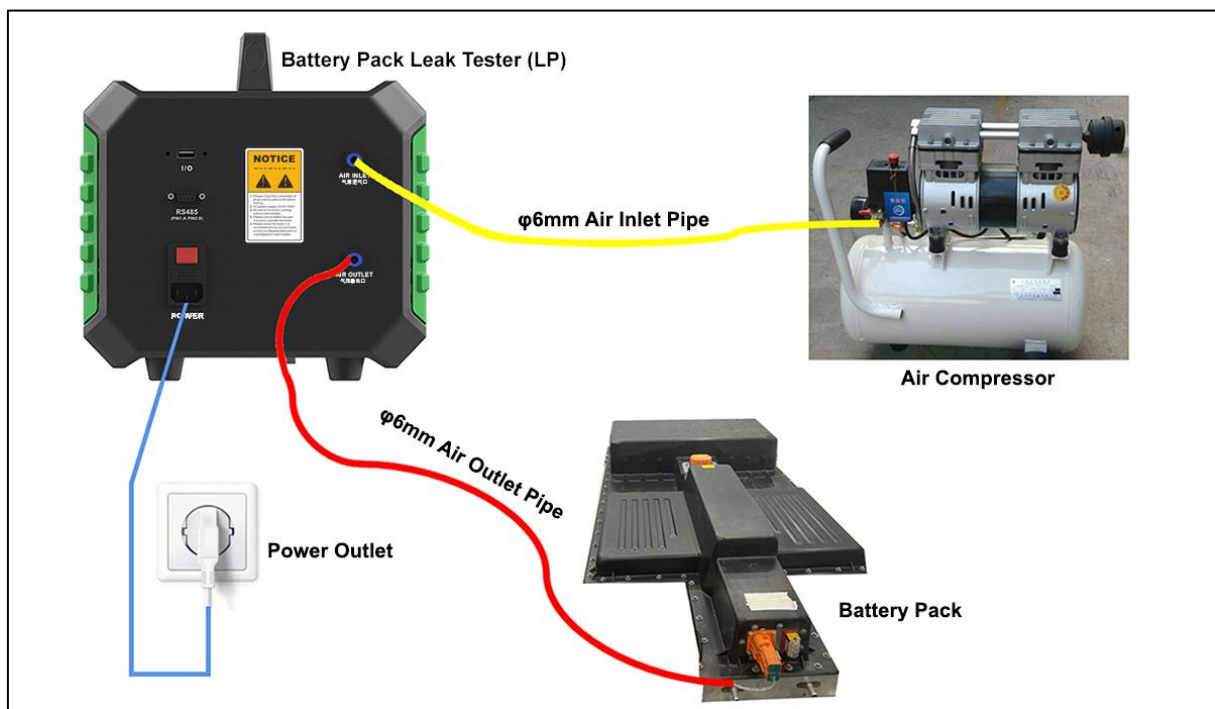
4. Operating Instructions

4.1 Panel Description

No.	Name	Description
1	USB Port	For data download.
2	RS485 Port	For data copy and transmit.
3	Power Switch	Tester turn on/off.
4	Power Socket	90~265V power input.
5	Air Inlet Port	Air supply inlet.
6	Air Outlet Port	High/Low pressure output.

4.2 Tester Connection

1. Air Supply Connection: Connect the 0.1~1.0 Mpa dry and clean air source to the air inlet port of the tester through the $\phi 6\text{mm}$ air pipe.
2. AC Input Connection: Use the provided power cord to connect the tester to 90~265V AC power supply.
3. Battery Pack Connection: Connect the battery pack and tester's air outlet port with a $\phi 6\text{mm}$ air pipe. Ensure the airtightness of the connection.



Connecting Diagram

4.3 Main Unit Operation

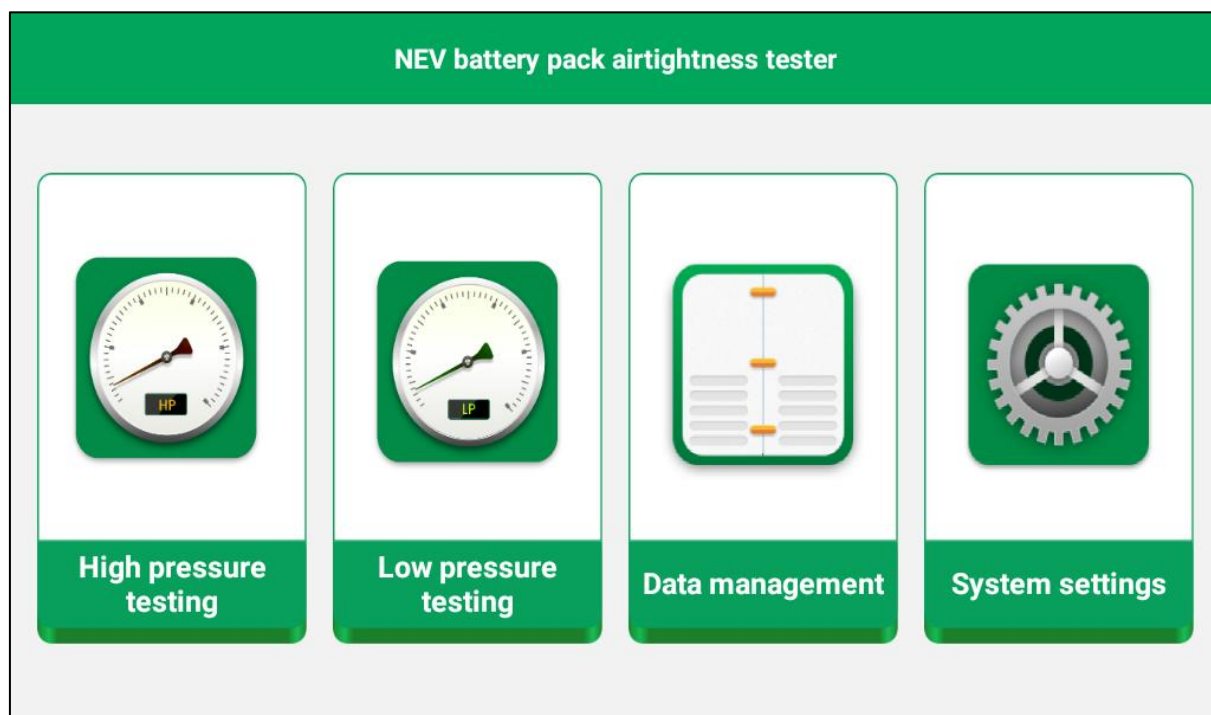
4.3.1 Welcome Screen

Turn on the power switch to start the tester. The screen will display the welcome page firstly.



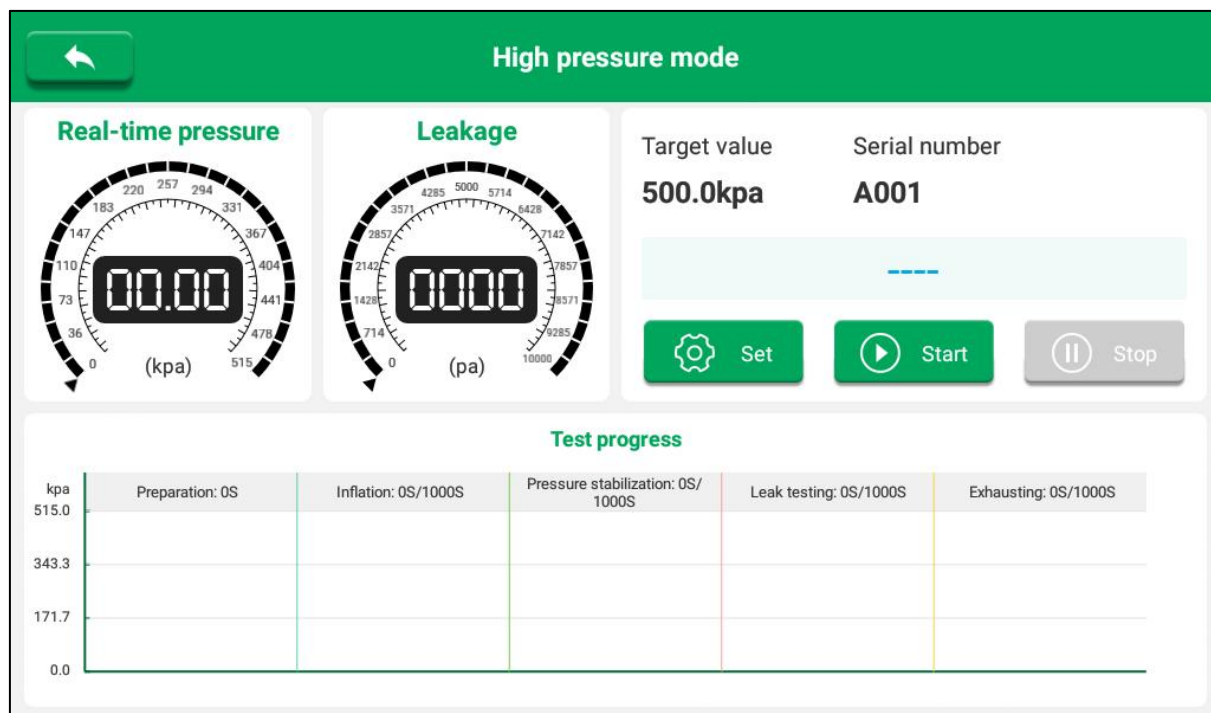
4.3.2 Main Menu

Enter the main interface after startup. The functional modules of the main interface include High pressure testing, Low pressure testing, Data management and System settings.



4.3.3 High pressure testing

Tap **High pressure testing** on the main interface to enter the test interface. Leak test parameters can be preset.



Tap **Set** button to enter the high pressure mode configuration interface for parameter setting.

The interface is titled "High pressure mode configuration" and features a green header bar with a back arrow and a save icon. It contains eight input fields arranged in two columns:

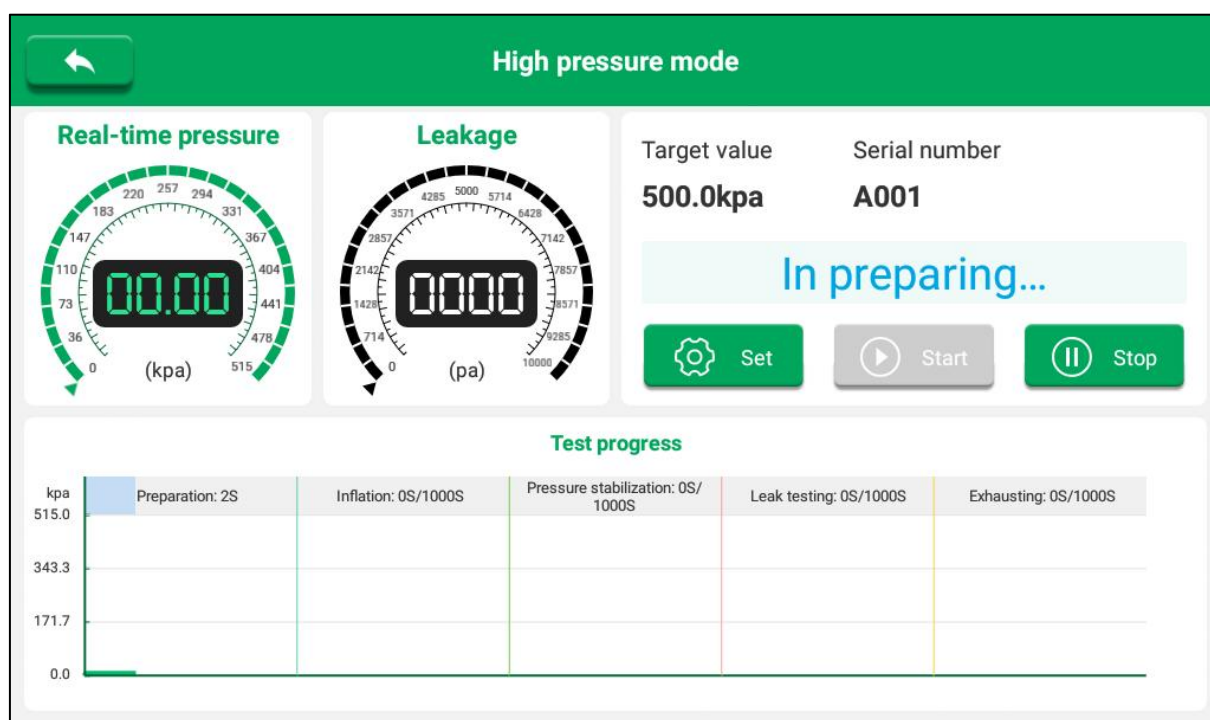
- Workpiece number: A001
- Leak alarm (pa/min): 5000
- Workpiece volume (L): 12.0
- Inflation time (s): 1000
- Test pressure (kpa): 500.0
- Stabilization time (s): 1000
- Upper pressure limit (kpa): 510.0
- Test time (s): 1000
- Lower pressure limit (kpa): 0.0
- Exhaust time (s): 1000

No.	Name	Description
1	Workpiece Number	Name the battery pack, can input the actual ID.
2	Workpiece volume	The battery pack volume, input the actual value.
3	Test Pressure	Set the target pressure for inflation.
4	Upper Pressure limit	The upper limit of the test range. It will be displayed on the real-time pressure dial.

5	Lower pressure limit	The lower limit of the test range. It will be displayed on the real-time pressure dial.
6	Leak Alarm	Airtightness determine condition Alarm value $\geq$ actual leakage value $\rightarrow$ Qualified Alarm value $<$ actual leakage value $\rightarrow$ Unqualified
7	Inflation Time	The inflation time can be set according to the battery pack size.
8	Stabilization time	A holding time that the tester will stop inflating and wait for pressure change.
9	Test Time	The test time that the tester starts to detect the change in the leakage value after the holding Time.
10	Exhaust Time	Time to exhaust gas after the test is complete.

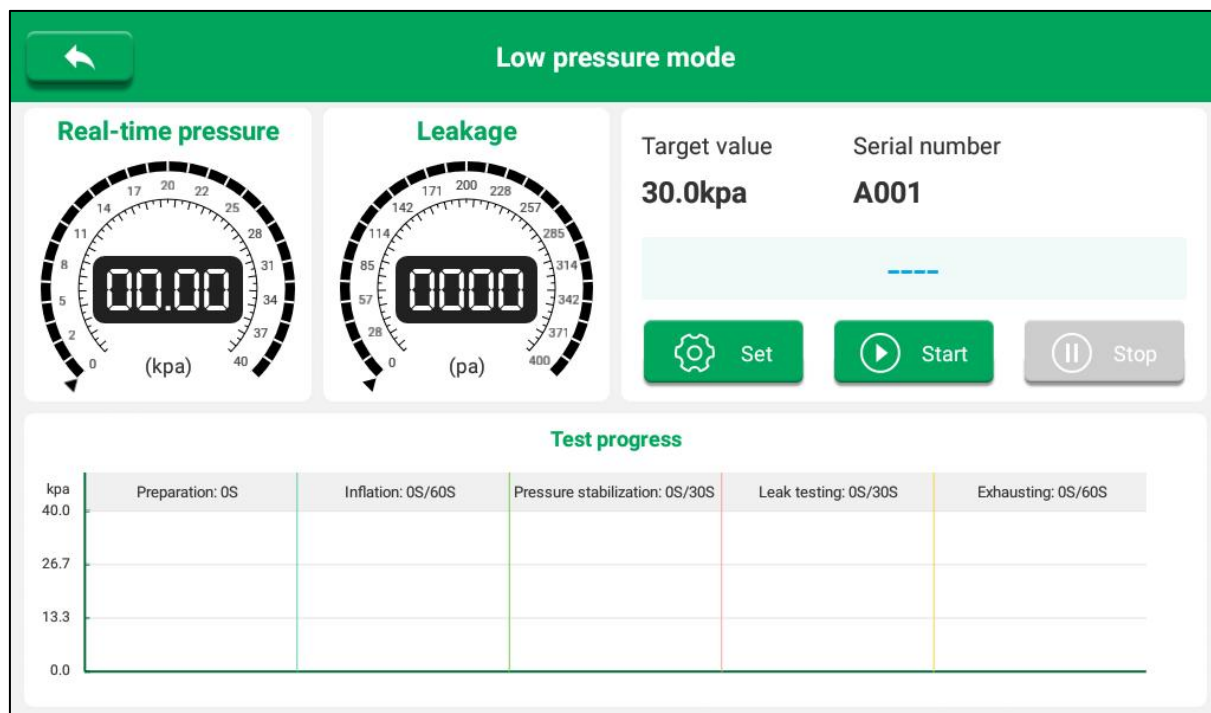
After the parameter setting is completed, tap **Start** to start the test. Users can view the real-time test data on the page and wait for the test result.

Tap **Stop** during the test to end the current test.



4.3.4 Low pressure testing

Tap **Low pressure testing** on the main interface to enter the test interface. Leak test parameters can be preset.



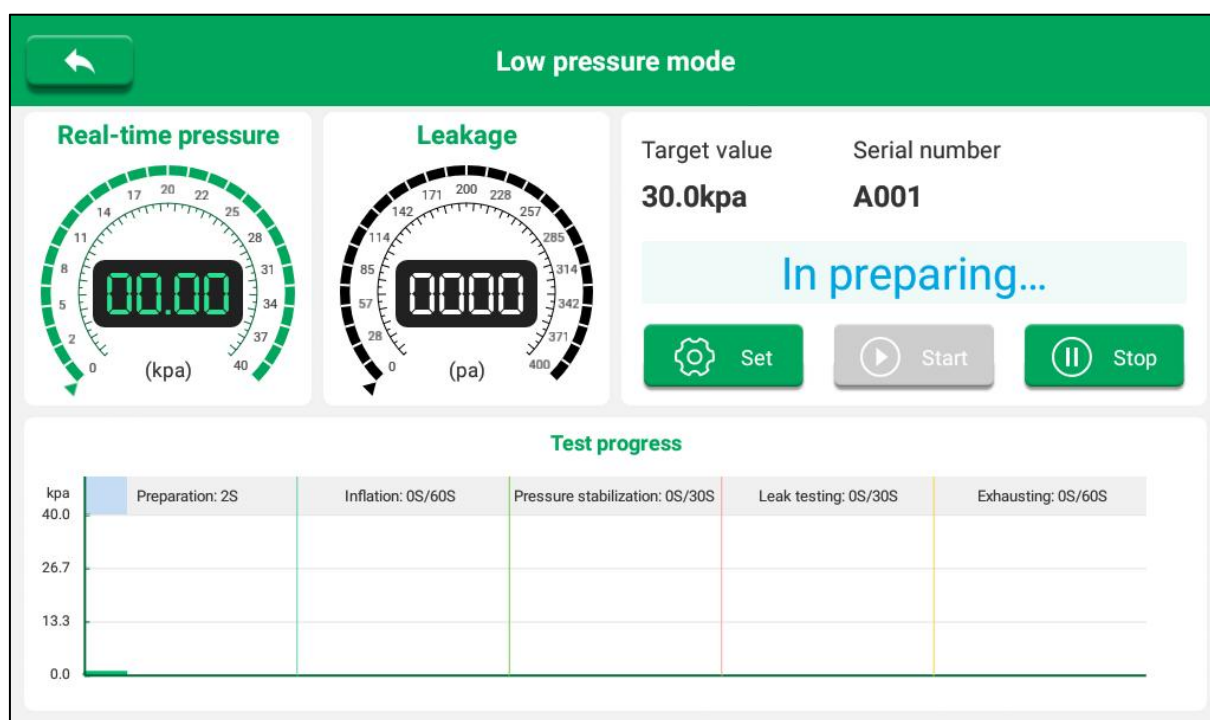
Tap **Set** button to enter the low pressure mode configuration interface for parameter setting.

No.	Name	Description
1	Workpiece Number	Name the battery pack, can input the actual ID.
2	Workpiece volume	The battery pack volume, input the actual value.
3	Test Pressure	Set the target pressure for inflation.
4	Upper Pressure limit	The upper limit of the test range. It will be displayed on the real-time pressure dial.

5	Lower pressure limit	The lower limit of the test range. It will be displayed on the real-time pressure dial.
6	Leak Alarm	Airtightness determine condition Alarm value $\geq$ actual leakage value $\rightarrow$ Qualified Alarm value $<$ actual leakage value $\rightarrow$ Unqualified
7	Inflation Time	The inflation time can be set according to the battery pack size.
8	Stabilization time	A holding time that the tester will stop inflating and wait for pressure change.
9	Test Time	The test time that the tester starts to detect the change in the leakage value after the holding Time.
10	Exhaust Time	Time to exhaust gas after the test is complete.

After the parameter setting is completed, tap **Start** to start the test. Users can view the real-time test data on the page and wait for the test result.

Tap **Stop** during the test to end the current test.



4.3.5 Data Management

Tap **Data management** on the main interface to read the data. Check a battery pack, insert the USB disk into the USB port on the panel, and tap **USB Flash Drive Dump** to transfer the corresponding data to the USB disk.

←
Data management

Enter keyword Q

☐ A001_200901201 51713
☐ A001_200901201 51629
☐ A001_200901201 51203
☐ A001_200901201 51023
☐ A001_200901201 41514
☐ A001_200901201 13305
☐ A001_200901161 23153
☐ A001_200901161 22512
☐ A001_200901161 15623

Total 20 data

Basic Info

Serial number
A001

Test pressure (kpa)
30.0

Test time
2009-01-20 15:17:13

Leakage (pa)
0

Test result
Manual stop test

Basic Info

kpa

Preparation: 10S
Inflation: 3S/60S
Pressure stabilization: 0S/30S
Leak testing: 0S/30S
Exhausting: 0S/60S

Select all

Delete

USB flash drive dump

4.3.6 System Setting

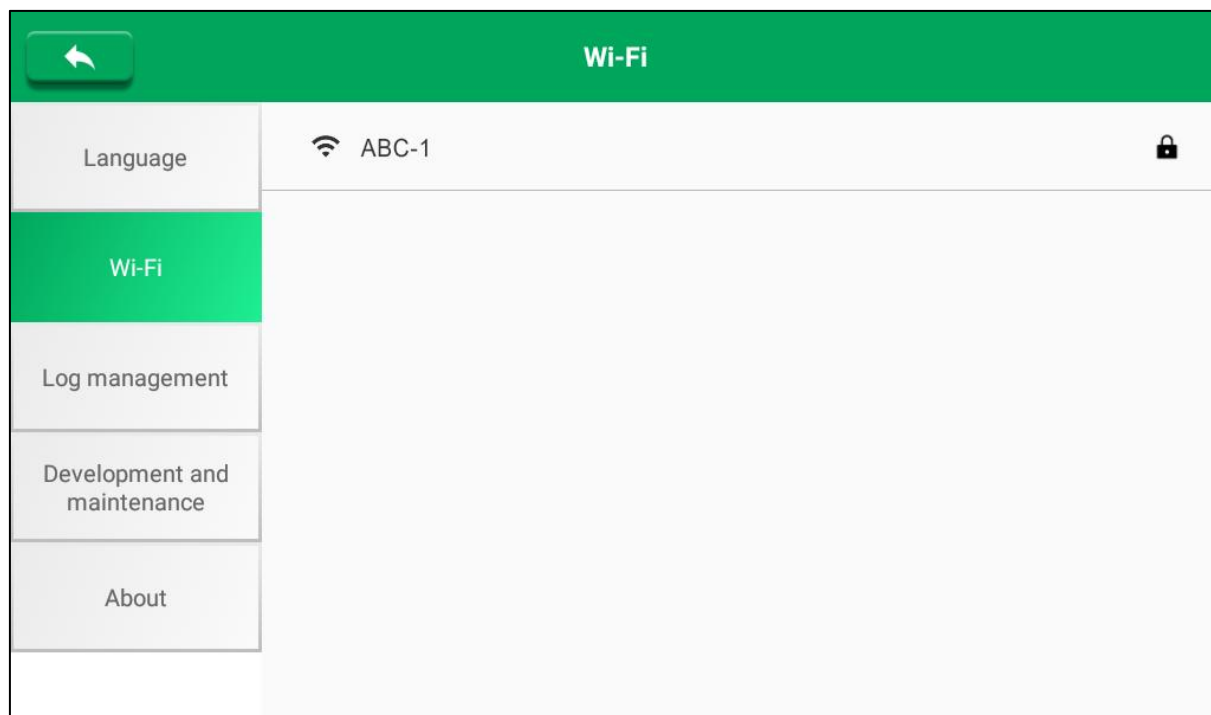
Tap **System Settings** on the main interface to enter the system setting interface, which includes Language, Wi-Fi, Log, Develop and About.

Language: Used to change the system language.

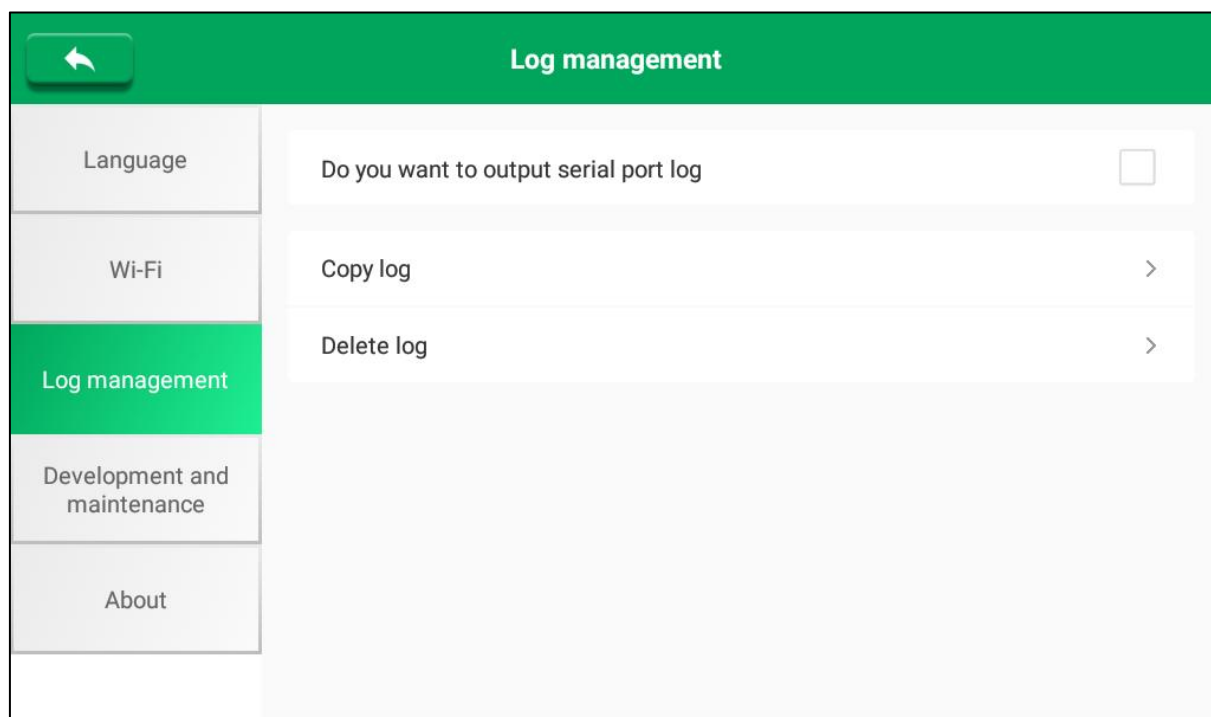
←
System settings

Language	中文简体	
Wi-Fi	中文繁體	
	English	✓
	Deutsch	
	日本語	
	Français	
Log management		
Development and maintenance		
About		

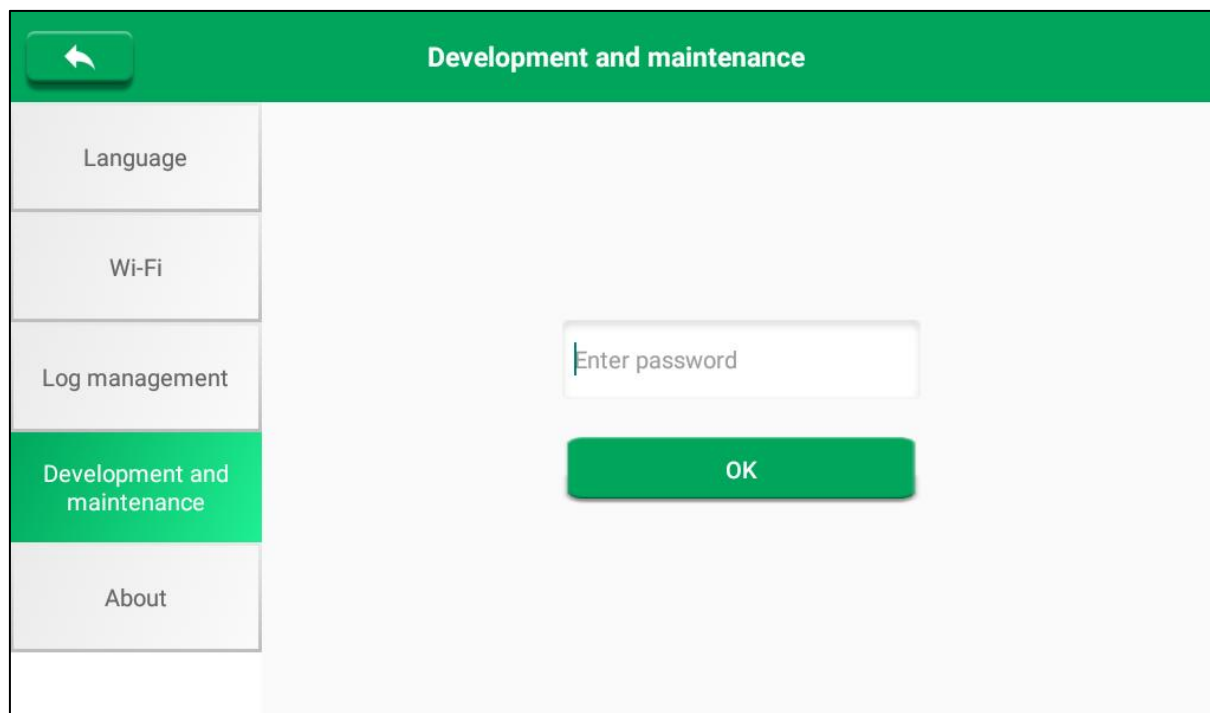
Wi-Fi: Used to set the Wi-Fi connection of the tester.



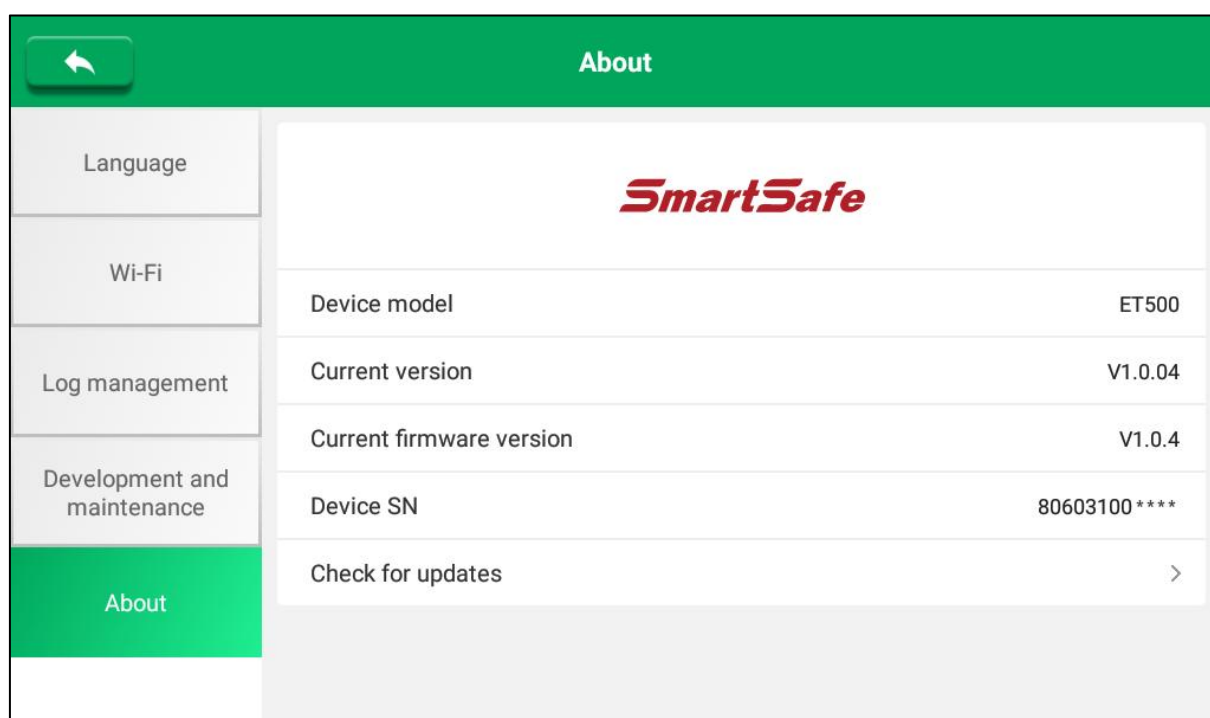
Log management: Used to save and view system logs.



Develop and maintenance: Only for development and maintenance.



About: Used to view system version information, etc.



5. Transport & Storage

- 1) This tester is equipped with special equipment box for packing, which is has anti-vibration and reliable for transportation.
- 2) Storage conditions: dry storage room, temperature: -20~70℃, Humidity: 95% Within.

6. Environmental Protection and Others

- 1) The outer carton of this equipment is made of recyclable material.
- 2) The main unit and other components are non pollution sources.

Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE SMARTSAFE PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYER'S BUSINESS.

SMARTSAFE electronic product is warranted against defects in materials and workmanship for one year from date of delivery to the user.

This warranty does not cover any part that has been abused, altered, used for a purpose other than for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any automotive meter found to be defective is repair or replacement, and SMARTSAFE shall not be liable for any consequential or incidental damages.

Final determination of defects shall be made by SMARTSAFE in accordance with procedures established by SMARTSAFE. No agent, employee, or representative of SMARTSAFE has any authority to bind SMARTSAFE to any affirmation, representation, or warranty concerning SMARTSAFE automotive meters, except as stated herein.

Disclaimer

The above warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

Purchase Order

Replaceable and optional parts can be ordered directly from your SMARTSAFE authorized dealer. Your order should include the following information:

- Order quantity
- Part number
- Part name

Statement:

SMARTSAFE reserves the rights to make any change to product designs and specifications without notice. The actual object may differ a little from the descriptions in the manual in physical appearance, color and configuration. We have tried our best to make the descriptions and illustrations in the manual as accurate as possible, and defects are inevitable, if you have any question, please contact local dealer or after-sale service center of SMARTSAFE, SMARTSAFE does not bear any responsibility arising from misunderstandings.

FCC Caution:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.