



Instruction Manual of High precision differential pressure tester

V1.01
版

Hirays Product Manual

Focus on R&D air leakage tester equipment for 14 years

The Brand Of China The Level Of The World



Revision of instruction manual of High Precision Differential Pressure Tester

Version	Change content	Valid Date
V1.01	First issue	2021.10.25

Preface

Dear Customers:



Thank you for trusting our brand and purchasing Hirays' High precision differential pressure tester . This tester is designed to be as practical and stable as possible. We are confident that it will bring you a very satisfactory experience during many years of use.


In order to operate the tester better, please read the instructions carefully. This manual introduces the installation, setting, product function, operation method, maintenance, repair and operation precautions of Hirays' direct pressure tester. Please read this manual carefully before use and keep it properly.

Safety precautions

This manual records how to use the direct pressure tester correctly and safely, and describes the contents of preventing harm and property loss to the operator and others. Do not perform operations other than those described in this operation manual.

[identification description]

SIGN	Content
 WARNING	If the following warnings are ignored, misoperations may result in personal injury or death.
 CAUTION	If the following precautions are ignored, misoperations may result in injury and property damage.

 WARNING
<ol style="list-style-type: none">1) Before turning on the power supply, make sure that the power supply is grounded2) If the grounding wire is not connected, it may cause an electric shock accident. The ground wire must not be connected to the natural gas pipeline, otherwise it will easily cause fire and electric shock accidents.3) Non Hirays' engineers, please do not open the case, otherwise it may cause electric shock and irreversible damage4) When there is dust on the metal part of the power plug and its surroundings, please wipe it carefully with a dry rag, otherwise it is easy to cause fire and electric shock accidents.5) If the high precision differential pressure tester is dropped or damaged, turn off the power and then pull out the plug. Otherwise, it is easy to cause an electric shock accident.6) When inflating the high precision differential pressure tester, the inflation pressure must not exceed the specified pressure, otherwise it's easy to cause equipment damage and personal injury.7) When water, oil and other liquids enter the tester, please turn off the power and pull out the plug. Otherwise it is easy to cause electric shock accident. In particular, special

attention should be paid when the direct pressure tester is installed near water and oil.

- 8) If the following situations occur to the tester, please stop the operation immediately and contact the relevant personnel of our company:
 - a) *Smoke
 - b) *Abnormal sound
 - c) *Operation failure
 - d) *Problems occurred that were not in the instructions
- 9) *When it is impossible to operate correctly according to the instructions.



- 1) Do not open the back cover of the tester if you are not an engineer from Hirays. Otherwise, the tester may be damaged or injured.
- 2) Objects shall not be placed on the upper part of the tester, within 20cm around, otherwise it will cause the accuracy of the tester to decrease.
- 3) Do not place the tester near the door, window, or outlet of the air conditioner, otherwise the measurement results will be inaccurate.
- 4) Don't install or remove the trachea in state of ventilation, otherwise it may cause injury.
- 5) Do not use the device in the environment with humidity, direct sunlight, and room temperature below 5° and above 40°, to avoid misoperation and failure.
- 6) The high precision differential pressure tester must be placed on a platform with sufficient load. Do not install in the strong vibration, unstable place, in order to avoid falling cause work-related accidents.
- 7) The test trachea of the tester should be of appropriate length, and the excess length should be stored to avoid accidental collision, which may cause the tester to fall to the ground and cause unnecessary losses.
- 8) When carrying the tester, unplug all cables and trachea, and hold the handle on the upper part of the tester with one hand and the lower part with the other hand. Otherwise, it is easy to cause personal injury and equipment damage.
- 9) When transporting the tester, protect it with sufficient shock-resistant material to avoid damage. For long-distance transportation, please use a wooden box.
- 10) When cleaning the surface of the tester, please use a soft cloth dampened with a small amount of water or alcohol to gently wipe.
- 11) Due to the upgrade of tester functions, the contents of this manual may be modified without prior notice.
- 12) Due to easy leakage of products and molds, misjudgment may be caused; when used in an inappropriate environment such as temperature changes, it may also cause misjudgment.

If there is anything unclear about the use of this tester, please contact our sales engineering as soon as possible.

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Chapter I、 Preparation and installation

1 . Open

1.1 Preparation

- a) Stable, dry, clean compressed gas with gas temperature at 26^{+2}°C with a pressure of 0.4mpa-0.8Mpa;
- b) Stable and reliable workbench;
- c) Stable and leak-free tooling and fixture;
- d) Power requirements: AC 220V($\pm 15\%$) 、 50HZ;

Insert the power cable of the tester, the air inlet and outlet pipes, and the 25pin cable for communication between the tester and the tooling; The connection mode is shown in Figure 1-3;

1.2 Accessories

When receiving our tester, please open the package and check whether the accessories are complete, and the appearance is good.

Name	Specification	QTY
φ8 trachea with quick connector	2M	1
φ4 trachea for testing	1.2M	1
Instruction manual	V1.01	1
Inspection report	Issued by quality control department	1

2. Tester composition

2.1 Front composition of the tester

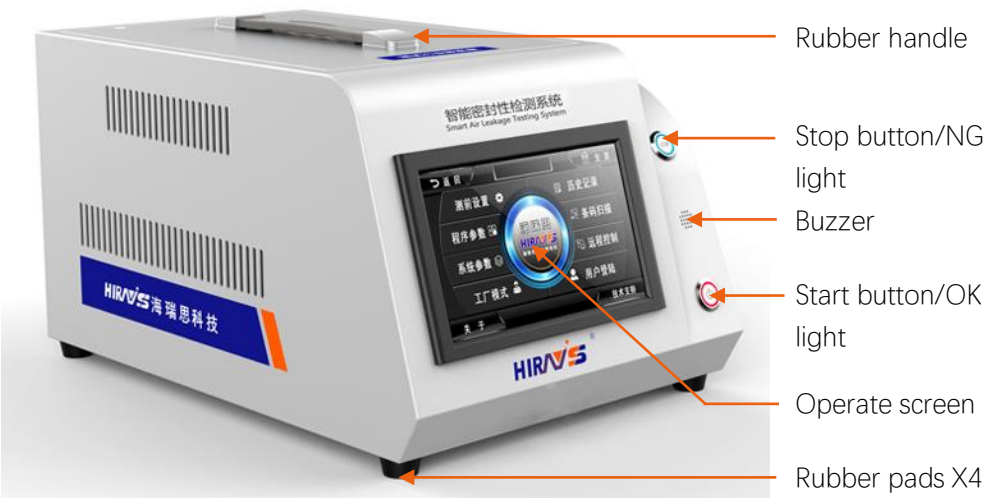


Figure 1-1

2.2 Back composition of the tester

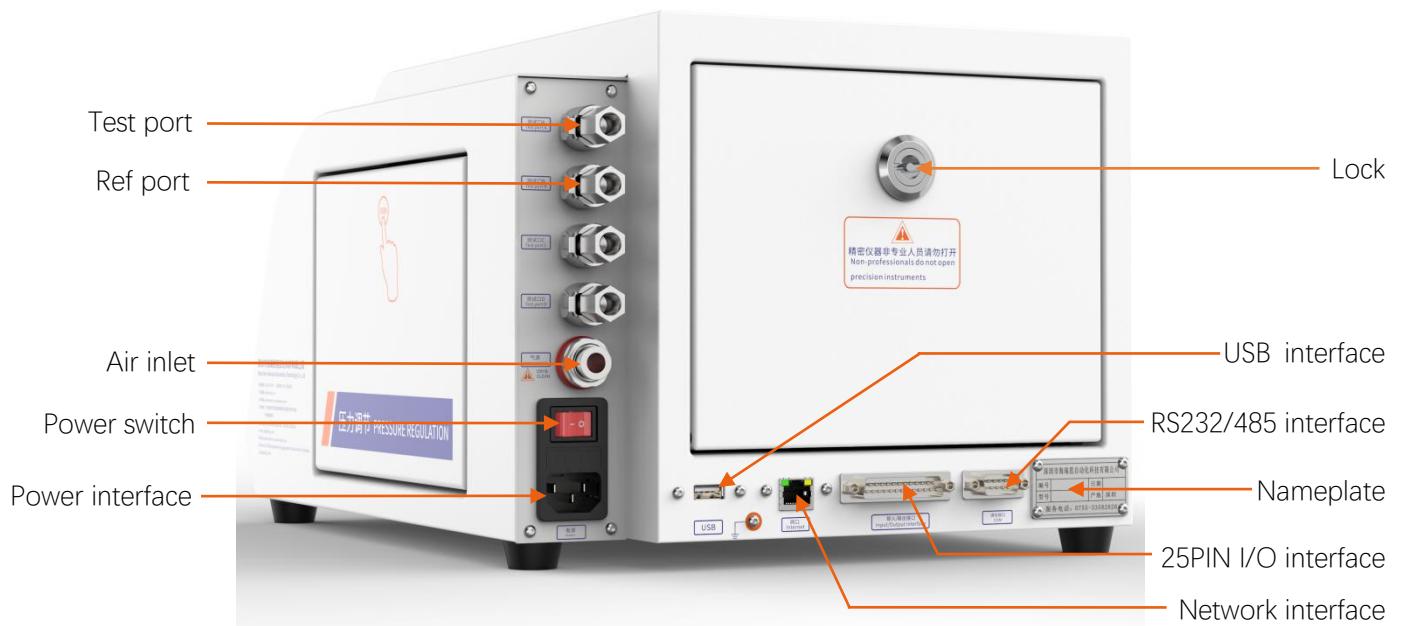


Figure 1-2

3. Tester installation and connection

3.1 Environment for installing high precision differential pressure tester

- Keep the working environment temperature at 26^{+2}°C ;
- Place the tester away from the door、vent、air conditioning port, etc;
- The workbench must be stable and reliable ,no sundries around;

3.2 Tester air source / power connection

- As shown in Figure 1-4, first place the tester on a flat and stable desktop, insert one end of the power cable into the power interface of the tester, and the other end into the 220V/50HZ single-phase power socket.
- Connect one end of $\phi 8$ air pipe to air inlet port of tester, and the other end to the factory air source;
- Connect the air pipe of the test interface to the fixture or mold;
- Turn on the power switch and wait for 2-3 seconds to complete the startup of the tester;

3.3 Connection of fixture and tester

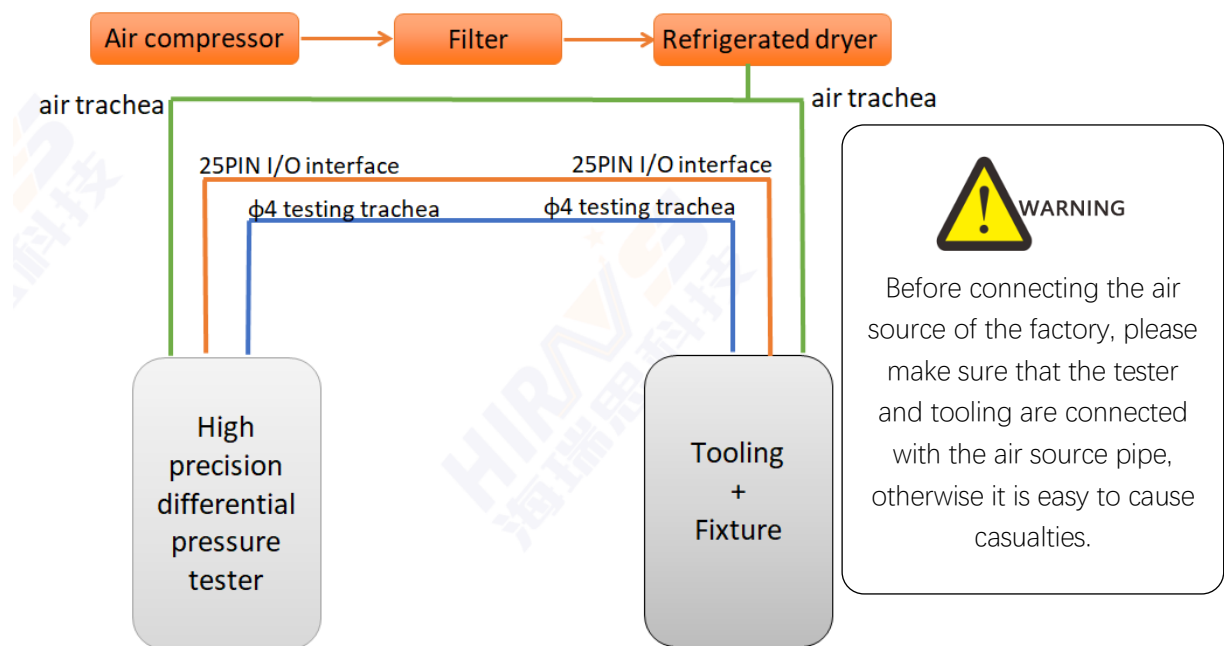


Figure 1-3



Figure 1-4

Connection steps of tooling and tester

- As shown in Figure 1-3, filtered, cooled and dried factory air source.
- The factory air source is divided into two channels, one for tooling and the other for tester;
- Both tooling and tester are connected by $\phi 8$ trachea;
- Connect the outlet trachea of $\phi 4$ on the tester to the air inlet of the mold;
- Connect the Ref port of the tester to the Ref port of $\phi 4$;
- Connect the 25p cable on the tooling to the tester;
- The connection between tooling and tester is complete;

3.4 Description of control interface

- a) Ethernet interface: used to connect the computer (optional);
- b) USB interface: used to export historical data or install code scanning gun;
- c) RS485 interface: Standard communication interface, can be connected to a computer. If you need a communication protocol, please contact the sales engineer;
- d) 25PIN I/O interface: Special control data interface of Hirays;

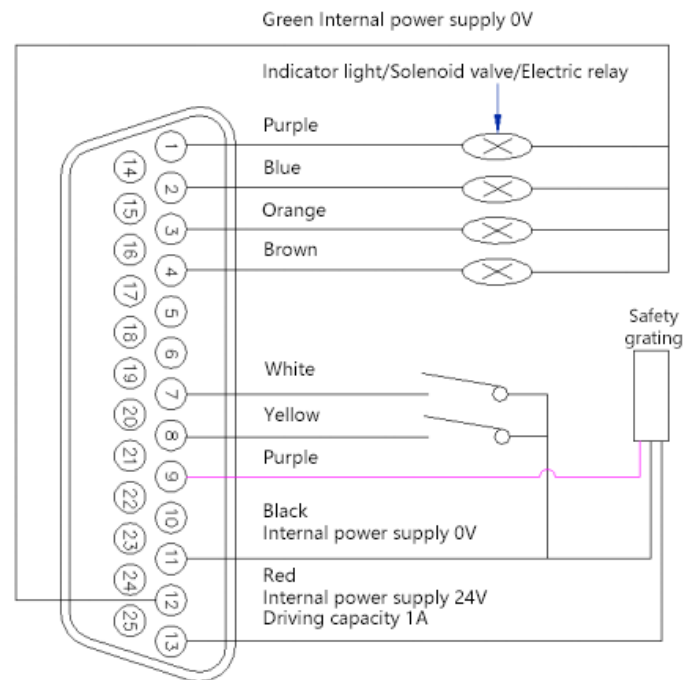


Figure1-5 25PIN external I/O interface

Pin number	Pin function	Pin number	Pin function
1	External output 1 (purple)	2	External output 2 (blue)
3	External output 3 (pink/orange)	4	External output 4 (brown)
5	External output 5	6	24V
7	External startup (white)	8	External stop (yellow)
9	Safety light curtain (grey)	10	Proximity switch(External output1)
11	GND (black)	12	GND (green)
13	Internal 24V power input (red)		

External output: The default is 24V DC output, maximum output current is 0.5A.

External input: NPN transistor input.



Figure 1-6 RS485 communication interface

Pin number	Leak tester pin function	Device port pin definition for connection to leakage tester
2	232_TX	232_RX
3	232_RX	232_TX
5	GND	GND
7	485_A	485_A
9	485_B	485_B

Remarks: For serial communication, the tester and computer are connected by straight line, 2 to 2, 3 to 3, 5 to 5.

Chapter II tester interface operation instructions

1. Overview

1.1 Interface description



Figure 1-1

Description:

- A: Back
- B: Pre-Set
- C: Program
- D: System
- E: Factory
- F: About Hirays
- G: Main

- H: Date
- I: History
- J: Bar code
- K: Remote
- L: Test interface
- M: User log
- N: Support

2. User login

"User login" includes login system, modify the password, new user and logout user.

2.1 How to login?

To use the tester, you must first log in. First click the user login button on the main interface as shown in Figure 2-1.



Figure 2-1

Figure 2-2 is showed, click User Login, as shown in Figure 2-3.



Figure 2-2

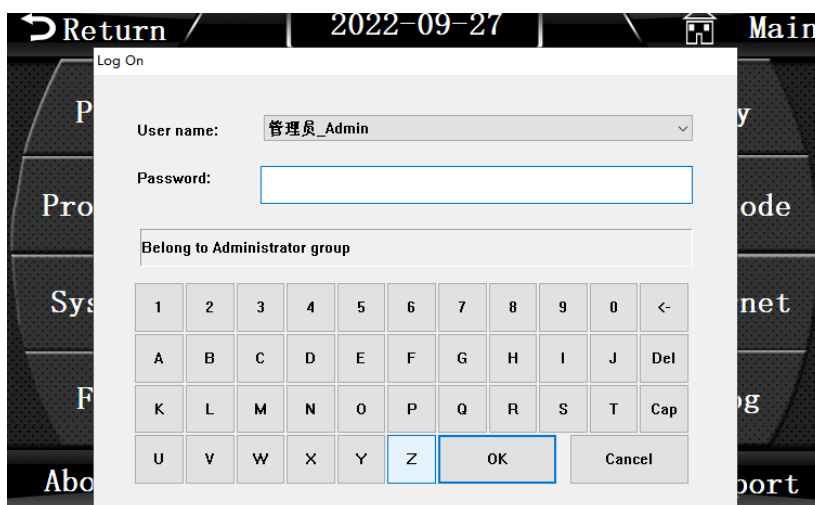


Figure 2-3

2.1.1 User description:

- a) Administrator: Belongs to the administrators group, can manage permission allocation.
- b) Operator: can operate the machine, but cannot modify parameters.
- c) Engineer: factory engineer, can view and modify parameters.
- d) Hirays' Engineer: can operate the machine, modify parameters, add and delete users.

2.1.2 Password description:

- a) Administrator default password: 35689
- b) Operator default password: 8888
- c) Engineer default password: 123456

2.2 How to modify the password?

Click the red box in Figure 2-4, and the display is as shown in Figure 2-5

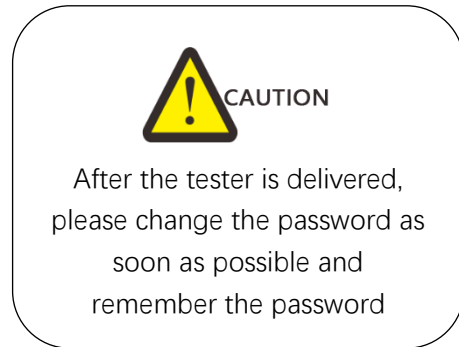


Figure 2-4



Figure 2-5

Before changing the password, you need to log into the corresponding user, enter the old password first, then enter the new password, confirm the new password, and press the OK button to complete the password modification.

2.3 How to logout the user?

2.3.1 The function of logout the user

Log out the user, that is, logout of the currently logged in user authority.

2.3.2 How to logout the user?

Click the red box as shown in Figure 2-6, and then click OK to logout the user.



Figure 2-6

2.4 New user

When the built-in users of the system can't meet the needs, new users can be created. This function can only be used by Hirays engineers. If you need to use it, please contact the relevant personnel of our company.

3. Pre-Set

"Pre-Set" includes the setting of the display mode, the setting of the start mode, the selection of the system language, and the selection of the P (pressure) unit and L(leak)Unit; You can check the current pressure and the Press zero;

Click the red box on Figure 2-7 to enter the Pre-Set, and then enter the following page as shown in Figure 2-8,



Figure 2-7



Figure 2-8

3.1 Display mode

Click the white button in the red box as shown in Figure 2-8 to switch the display mode.

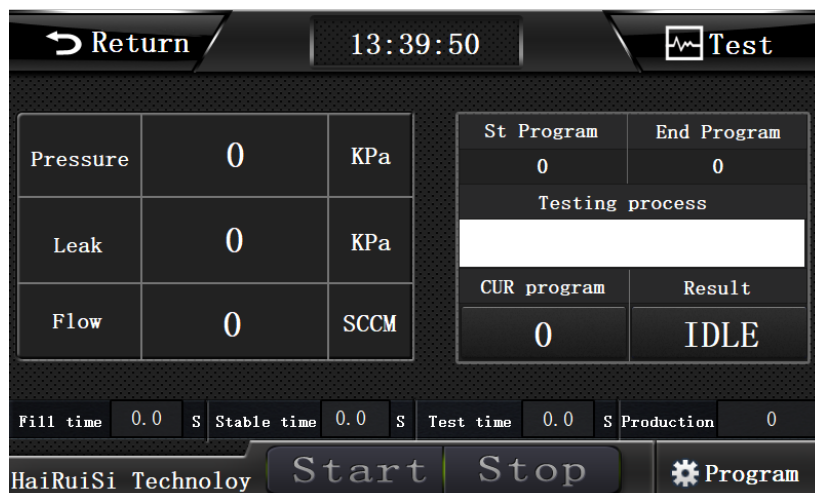


Figure 2-9



Figure 2-10

- Digital display:** as shown in Fig. 2-9, you can know the pressure of the current test pipeline on the test interface, and the leak of the current product after the test; The current program number can be seen on the right side, and the Fill time, Stable time test time, and Production can be seen on the lower side.
- Curve display:** as shown in Fig. 2-10, based on digital display, the pressure curve from the beginning of the test to the end is added on the right side, which can more intuitively understand the pressure change trend.

3.2 Start Mode:

As shown in Figure 2-11, click white button in the red box to switch the startup mode.



Figure 2-11

- Fixture start:** Only the two-handed start button on the fixture can be used. At this time, the start and physical keys on the tester screen cannot be started. Fixture start is suitable for operation by the operator after commissioning, more secure.
- Tester starts:** At this time, both tooling and tester can start the test program;

3.3 Language

As shown in Figure 2-12, click the white button in the red box to switch the language display.



Figure 2-12

- a) ENGLISH: Display in English.
- b) CHINESE: Display in Chinese.

3.4 Unit selection

As shown in Figure 2-13, click the button in the red box to switch units.



Figure 2-13

3.4.1 Unit description

- a) Pa: Pascal
- b) Kpa: Kilo Pascal
- c) MPa: Mega Pascal
- d) Bar: Bar
- e) mbar: Mill bar
- f) Psi: Psi/Inch²

3.4.2 Unit conversion

3.4.2.1 Precautions for unit conversion

The unit of this tester is automatic conversion. Once the unit is set, do not switch units quickly, otherwise the setting will be wrong.

3.4.2.2 Unit conversion form

Unit	Kpa	pa	Kgf/cm ²	Psi	mmH ₂ O	Bar	Mbar	mmHg
1Kpa	1	1000	0.0101972	0.1450377	101.972	0.01	10	7.500612
1Pa	1000	1	1.02×10 ⁻⁵	1.45×10 ⁻⁴	0.101972	1.0×10 ⁻⁵	0.01	0.007501
1Kgf/cm ²	98.0665	98066.5	1	14.2233	10000.037	0.98066	980.7	735.5592
1Psi	6.89476	6894.76	0.07030	1	703.07216	0.068947	68.95	51.71493
1mm H ₂ O	0.00981	9.80661	1.0×10 ⁻⁴	0.0014223	1	9.81×10 ⁻⁵	0.098	0.0735557
1Bar	100	1×10 ⁵	1.0197162	14.503774	10197.2	1	1000	750.06168
1Mbar	0.1	100	0.00101	0.0145038	10.1972	0.001	1	0.7500617
1mmHg	0.13332	133.322	0.00135	0.01933	13.59514	0.00133	1.333	1

3.5 Leak unit

As shown in Figure 2-14, by clicking the drop-down button in the red box, the leak unit is switched, and the leak unit of the test interface will be changed accordingly after switching.



Figure 2-14

3.5.1 Unit description

- a) Pa: Pascal
- b) Pa/s: Pascal/second
- c) SCCM: Standard cubic centimeter per minute
- d) ml/min: Milliliter/min

3.5.2 Unit calculation

The relationship between the amount of leak per unit time and the differential pressure can be calculated by using the following formula.

$$\text{Formula: } Q = \frac{\Delta P \times V_e}{1.013 \times 10^5} \times \frac{60}{T}$$

Q: Leak

ΔP : Leak

V_e : Equivalent internal volume (ml) [volume of test pipeline+ internal volume of product]

T: Testing time (s)

The leak tester uses standard atmospheric pressure to make this calculation, if the atmospheric pressure at the time of test is standard atmospheric pressure, that is, 1.013×10^5 , and the temperature standard is 20°C , the amount of leak per unit time in the standard state can be calculated.

3.6 Current pressure

Display the current real-time pressure value.

3.7 Pressure regulation

After clicking the button, the pressure will display the current pressure for pressure adjustment, and the mechanical regulator on the right can adjust the test air pressure.

4. Program parameters

"Program parameters" includes the settings of Test type, Test function, Test time, Pressure parameter and Output.

Click the red box as shown in Figure 2-15 to set program parameters, Figure 2-16 shows the interface after entering the tester for semi-finished product testing, and Figure 2-17 shows the interface for finished product testing



Figure 2-15



Figure 2-16



Figure 2-17

4.1 Test type selection

Click the green button in the red box as shown in Figure 2-18 to switch the test type.



Figure 2-18

- Leak test: indicates the current program, using leak test for semi-finished products.
- Sealed Component: indicates the current program, using leak test for finished products.

4.2 Fill Type selection

Click the button in the red box as shown in Figure 2-19 to switch the Fill Type.



Figure 2-19

- Standard: Filling directly to the specified air pressure according to the normal commissioning air pressure;
- Auto: For electrical proportional valves, the Filling stage is added to the set air pressure and ends with Filling;
- Instruction: For MES systems, select instruction to control tester inflation through system commands.
- Ramp: For electrical proportional valves, the tester will be inflated to the specified air pressure at a ramp speed according to the set time during the inflation phase.
- Fixt Ramp: For MES systems and electrical proportional valves, select Fixt Ramp can control the tester to charge at a constant rater through system commands.

4.3 Auto Calibration

Click the button in the red box shown in Figure 2-20 to start the calibration set. The content in the blue box as shown in Figure 2-21 appears, generally do not adjust, if you need to adjust, please contact Hirays’ engineer for explanation.



Figure 2-20

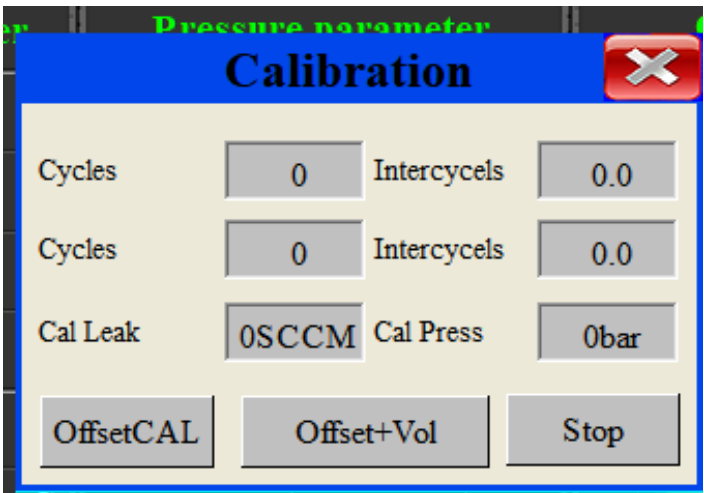


Figure 2-21

4.4 Additional function

Click the green button in the red box of Figure 2-22 to switch to test additional function.



Figure 2-22

- Leak signed: Adjust the display value of the product test leak. During the negative pressure test, the leak data is generally negative. If this button is turned on, the test result will be displayed as a positive.
- Volume: When used for finished product testing, large leak judgment, after choosing Sealed Component, this button will be turned on, and then the button will become to volume; The "BLEakMax and BLEakMin" in ml of the test pressure parameter on the right is the threshold value for this determination; For example, if the volume standard of the mold gap is 30ml, then the upper volume limit is set to 32ml, and the lower volume limit is set to 29ml, if the measured volume is beyond 29-32ml, then the product will be judged as a large leak. If it is within this range, the tester will start to judge whether there is a small leak.
- BigLeak: When used for finished product testing, large leak judgment, choose the BigLeak after selecting the finished product test, at this time the unit of the "BLEakMax "and "BLEakMin" of the tester will disappear, here should enter BigLeak to determine the large leak, this function is rarely used except for benchmarking.

4.5 Time parameter

Directly click the number in the red box shown in Figure 2-24 to modify the corresponding time.



Figure 2-24

- Filling:** the air inlet time indicates the time for the tester to inflate into the product to be tested and the REF port, which is generally set at 5-10 seconds.
- Stable:** the time for the air filled into the product to stabilize the pressure, generally set as 5-10 seconds;
- Testing:** Indicates the time for the tester to start testing whether the product is leak, generally set to 5-15 seconds, depending on the product;
- Exhaust:** generally set to 2-5 seconds;
- Pre-fill:** Semi-finished product test is set to 0; in the Sealed component, the time for the quantitative air inlet control tester to inflate the air tank is generally 5 seconds.
- Fixture:** Semi-finished product test is set to 0; in the Sealed component and volume test type, the fixture indicates the time for the air tank to be divided into the test port and the standard port, which is generally set to about 5 seconds;
- Balance:** When the balance time is set, we press the test button, and the tester will wait for the response time before starting the program; For example, the balance is set to 2 seconds, after we press the test button, the tester will wait 2 seconds before inflating the product;
- Next:** used to connect the next test program. When there is only one program, the current program number is the same as the next program number. When there are two or more programs, the next program points to the next program number;

4.6 Pressure parameter

Directly click the number in the red box shown in Figure 2-25 to modify the corresponding data.



Figure 2-25

(Model HC-BXXXX-XBX is a semi-finished product tester, Model HC-BXXXX-XAX is a finished product/semi-finished product tester. X indicates additional options)

- Fill Press:** the standard pressure when the product to be tested is pressurized, depending on different requirements;
- Press Max:** When testing for positive pressure semi-finished products, the Press Max can be used to control the upper intake limit, exceeding this value the tester will automatically stop the test, and the value is generally set to (Fill Press) \wedge (+5Kpa); When it is a negative pressure semi-finished product test, the Press Max is the standard for judging the large leak of the product;
- Press Min:** When it is a negative pressure semi-finished product test, the Press Min setting value can be used to control the lower intake limit, beyond this value the tester will automatically stop the test, the value is generally set to (Fill Press) $_$ (-5Kpa); When it is a positive pressure semi-finished product test, the Press Min is the standard for judging the large leak of the product; For example, if it is set to 11.2kpa, the test pressure is lower than 11.2kpa, and it is judged to be unqualified;
- Leak Max:** Determine the upper limit of the small leak of the product, such as setting 50pa, if the small leak is greater than 50pa, it will be judged to be unqualified.
- Leak Min:** Determine the lower limit of the small leak of the product, such as setting -50pa, if the small leak is less than -50pa, it will be judged to be unqualified;
- Offset:** Take a completely no-leak product, put it into the test mold, if the leak value tested is 50pa, the offset calibration needs to be filled with -50Pa; Generally, it does not need to be set, and the default is 0.
- B Leak Max:** This verdict is ineffective when testing semi-finished products. When the finished product is tested, under the " volume " function, the unit is ml, and the product large leak is determined by setting the upper limit of the volume, such as setting it to 300ml, the test value is higher than 300ml, and it is judged to be unqualified; Under the "Big Leak" function, there is no unit, which is used to determine the large leak of the product by setting the upper

limit of the volumetric coefficient.

- h) B Leak Min: This verdict is ineffective when testing semi-finished products. When the finished product is tested, under the " volume " function, the unit is ml, and the product large leak is determined by setting the lower limit of the volume, such as setting it to 250ml, the test value is higher than 250ml, and it is judged to be unqualified; Under the "Big Leak" function, there is no unit, which is used to determine the large leak of the product by setting the upper limit of the volumetric coefficient.
- i) Volume: In direct testing, the volume of the internal space of the product plus the volume of the test pipeline, and the volume of the gap between the product and the mold plus the volume of the test pipeline in ML during indirect testing; In general, do not need to set, when the leak unit is selected as SCCM, ml/min and other rate units, you must enter this volume, otherwise the leak value cannot be displayed.

4.7 Output status




Figure 2-26

- a) Directly click the numbers in the red box in Figure 2-26 to modify the corresponding data. The tester can control 4 groups of external outputs by default, after the start button is pressed, the tester does not start the test for a period of time, by controlling the on-off sequence of the solenoid valve to complete the corresponding action, and then control the fixture to complete the corresponding action, down or up. (When the selected tester model is high and low voltage switching, positive and negative pressure switching, only 3 sets of external outputs can be controlled)
- b) The output state is divided into two states: ON/OFF.ON means the fixture performs part of the action, OFF means the fixture resets.
- c) If the external output 1 is connected to a solenoid valve that controls the cylinder, change the first group of OFF to ON for 3S before the test, which means that the external output 1 will be turned on with a delay of 3 seconds after pressing the test button. Shown in the fixture, after the start button is

pressed, the clamp delays for 3 seconds and then presses down.

- d) If the external output 1 is connected to a control cylinder solenoid valve, the first group of OFF 4S after the test, means: the external output 1 after the end of the test, delay 4 seconds to open, as shown in the fixture, after the test is completed, the cylinder delay 4 seconds to rise.



CAUTION

When the tester model is HC-BXXXX-XX**A**, HC-BXXXX-XX**B** high and low pressure or positive and negative pressure tester, the external output 4 before the test indicates negative pressure or low voltage test when it is in the ON state, and high voltage test when it is in the OFF state.

4.8 Description of button above

As shown in the red box in Figure 2-27



Figure 2-27

- Return: click this button to return to the main interface
- NO.0: Indicates that the current used program number is 0;
- Program0: Click this button to modify the program name, as shown in Figure 2-28, click the blue box to switch the input mode: uppercase, lowercase, symbols, pinyin. Finally, click OK to save the program name.
- Search: Click the button, the page shown in the red box in Figure 2-29 will appear, click the program name to jump to the corresponding program; click the button shown in the black box to switch the number of pages displayed; there are 25 programs in total.
- Test: click to return to the test interface;

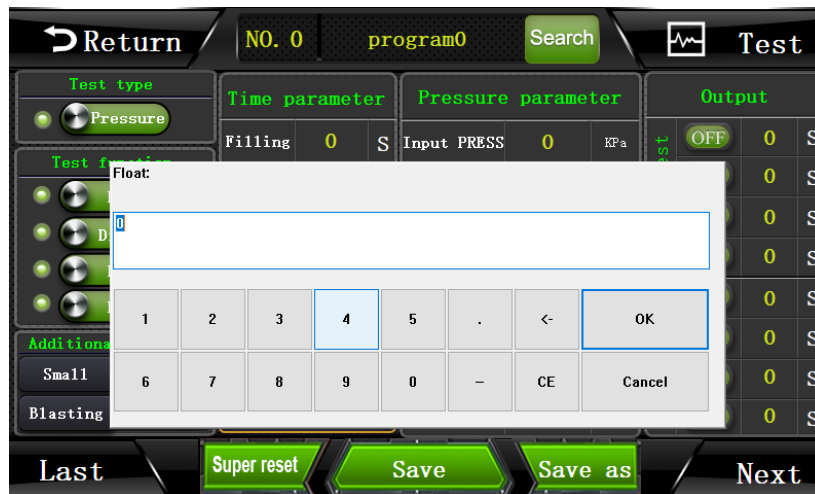


Figure 2-28

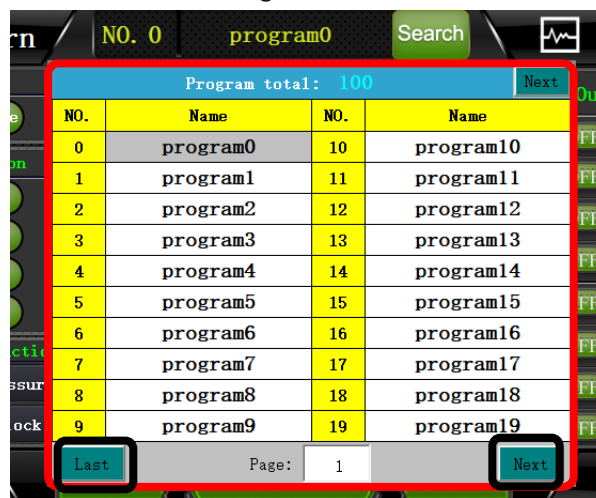


Figure 2-29

4.9 Description of button below

As shown in red box in Figure 2-30



Figure 2-30

- a) Last/Next: click to go to the last/next program.
- b) Super reset: Click to reset the current program.

- c) Save: Click to save the current program. If you modify the program, be sure to click Save, otherwise the program will malfunction.
- d) Save as: click and the display as shown in Figure 2-31. You can copy the current program to another program and automatically add the program name as: current program name_ copy.



Figure 2-31

5. System settings

"System Settings" includes input/output control, bar code parameter, and advanced parameter settings and others.

5.1 How to enter system settings?

Click the red box as shown in Figure 2-32 to enter the system settings, and Figure 2-33 is the page after entering.



Figure 2-32

Public parameter

Input	Output	PLC	Others	Communication	Advanced
X0	Y0 Y8	BLEakMin 0	Channel 0	Device1 NG	Advanced
X1	Y1 Y9	BLEakMax 0	BeepTime 0.0	Device2 NG	
X2	Y2 Y10	Barcode start OFF	Security grating ON		
X3	Y3 Y11	Barcode display Count			
X4	Y4 Y12				
X5	Y5 Y13				
X6	Y6 Y14				
X7	Y7 Y15				

Figure 2-33

5.2 Output

- Y11: External Output 1
- Y12: External Output 2
- Y13: External Output 3
- Y14: External Output 4
- Y15: Reserved for non-standard use, this tester is not used

5.3 PLC parameters setting

- BLEakMax: Enter the BLEakMax parameter, which is used to debug the sensitivity of the tester to determine the large leak;
- BLEakMin: Enter the BLEakMin parameter, which is used to debug the sensitivity of the tester to determine the large leak;
- Bar code start OFF: Bar code start is prohibited, and the tester needs to be manually started after scanning the code
- Bar code start ON: allow bar code start, after scanning the bar code, the tester will start automatically;
- Bar code display --count: that is, the code starts from 1;
- Bar code display --scan: that is, the bar code is scanned.

5.4 Other parameters setting

- Test channel: The system defaults to 1, modification is prohibited.
- Beep time: adjust the buzzer sounding time, generally set to 1 second.
- Security grating ON: when the safety grating is installed, turn on this button and install the safety grating. When there is no foreign object blocking between the gratings, it can be started normally, otherwise it cannot be started.
- Security grating OFF: turn off the safety grating detection function.

5.5 Communication status

- a) Device 1 OK: the default is OK; if it is NG, all program parameters become 0, adjust the inlet pressure, no pressure display
- b) Device 2 OK: the default is OK; if it is NG, all program parameters become 0, adjust the intake pressure, no pressure display;

5.6 Advanced parameters

5.6.1 Advanced parameter setting (not to modify at will, please consult the corresponding engineer if necessary)

Figure 2-34 shows the first page of advanced parameter settings, and Figure 2-35 shows the page after clicking to select

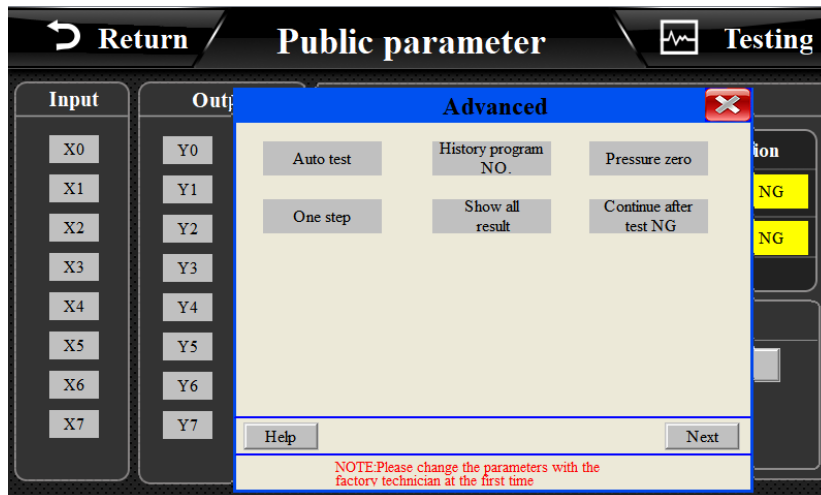


Figure 2-34

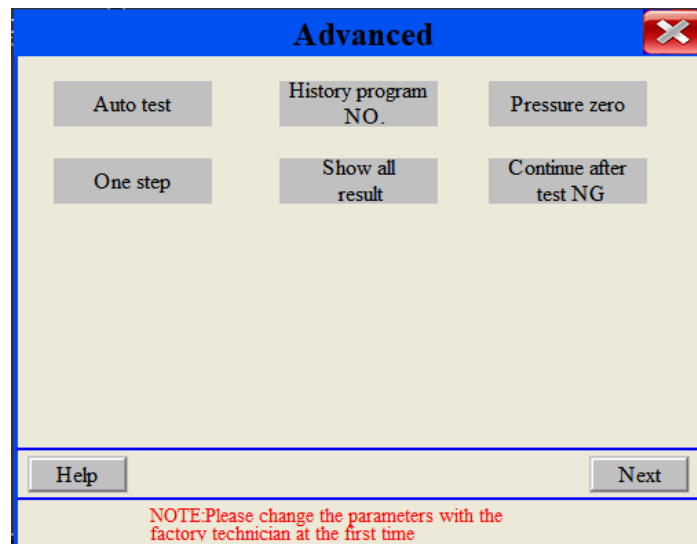


Figure 2-35

- a) Auto test: After this function is turned on, the tester starts to run the current program automatically, unless the current function is turned off or the power is cut off, the auto test will not stop! During operation, if you press the stop button, it will pause for 15 seconds, after 15 seconds, the tester will automatically start the test;
- b) One Step: when this function is applied to multiple program tests, the results

will be displayed after each program test is completed. If you want to continue the test, press the start button again.

- c) History program NO.: The first column of history record shows the program number; after this function is enabled, the first column of history shows the product model.
- d) Show all result of OK/NG: when multiple programs are in progress, if there is a program test result NG, the tester will display NG, if not, it will not display;
- e) Pressure zero: This function of the high precision differential pressure tester is invalid.
- f) Continue after test NG: When multiple programs are connected to test, the test will be stopped after NG by default. After this function is turned on, when the product has a large leak, the inlet pressure exceeds the PressMax, or exceeds Leakmax, the next program will still continue automatically after NG occurs.

5.6.2 Advanced parameter setting 2

As shown Figure 2-36

Advanced2			
Stop at current	0	Metallic sensor OFF	0S
Pressure adjust interval	0.0S	Check after NG	0
Fast fillin	0.0S	Exhaust before Test	0.0
Reference volume	0.000ml	Atmospheric coefficient	0
Barcode Start Delay	0.0	da0_rate	0
		da_zero	0
<div> Help IO refuction Next </div>			
<p>NOTE: Please change the parameters with the factory technician at the first time</p>			

Figure 2-36

- a) Stop at current program number: for multiple programs, during the test, press emergency stop, or STOP, the tester executes the current program;
- b) Stop reset program and cycle last program: Stop reset or safety grating reset, the tester is executed the last program;
- c) Stop reset specify program : when stop reset or emergency stop reset, the tester executes the specified program;
- d) Pressure adjust interval: The quick inflation function is only effective when it is opened. The later time refers to the time when the pressure is self - adjusted to determine whether the inflation pressure reaches the test pressure.
- e) Fast fillin: Turn on the fast inflation function, and the time after it refers to the single time of fast inflation, which is used to make the product with large volume mature quickly to reach the test pressure.

- f) Reference volume: Used to set the volume of the tester air tank.
- g) Barcode start delay: When the code scanning function is used, set the time to make the tester start after the code scanning is delayed.
- h) Metallic sensor: When the entry and exit slide table of the tooling is installed with a switch in place, this function setting is effective, then the rear time is the slide table movement time, generally 3 seconds; If the proximity switch is invalid, this function is invalid.
- i) Check after NG : After testing the product NG, the operator must press the reset button to take out the NG product for the next test, otherwise the test mold will not be opened and the product cannot be taken out; when setting, please consult the Hirays' engineer.
- j) Exhaust before test: Before the test, the tester will exhaust before entering the test phase.
- k) Atmospheric coefficient: The default is 1013, which cannot be easily changed;

6. Test interface

Click the Hirays' LOGO on the boot interface or the "Test" button in the upper right corner of any interface to enter the test interface.

6.1 Leak test interface

Shown as Figure 2-37

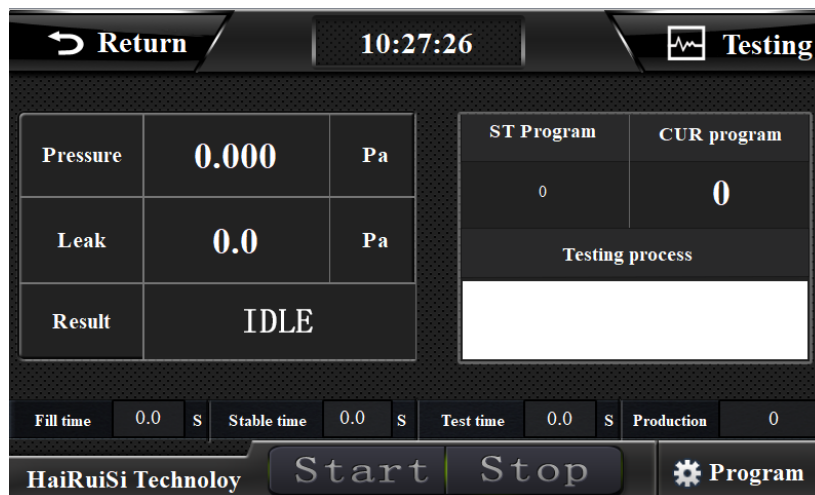


Figure 2-37

- a) Pressure: Record the current test pressure value;
- b) Leak: Displays the value of the test leak;
- c) Result: divided into fixture installation, Fill time, stable time, Test time, OK, NG, standby and other states;
- d) St program: which program to start from;
- e) End program: which program to run to the end;
- f) CUR program: which program is currently being tested;
- g) Testing progress: Display the test progress with a progress bar;

- h) Fill time: Real time display of current inflation time;
- i) Stable time: display the current voltage stabilization time in real time;
- j) Test time: display the current test time in real time;
- k) Production: count how many times the tester has been tested since the first test;

6.2 Sealed Component test interface

Shown as Figure 2-38

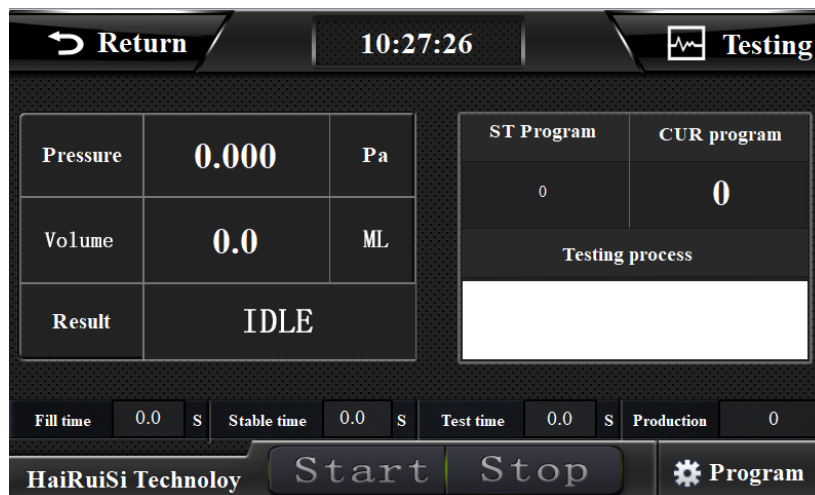


Figure 2-38

- a) Pressure: Record the current test pressure value;
- b) Leak: Displays the value of the test leak;
- c) Volume: The displayed value is the volume of the gap between the product to be tested and the mold plus the volume of the test pipeline, which is used to determine the large leakage of the product.
- d) Result: divided into fixture installation, Fill time, stable time, Test time, OK, NG, standby and other states;
- e) St program: which program to start from;
- f) End program: which program to run to the end;
- g) CUR program: which program is currently being tested;
- h) Testing progress: Display the test progress with a progress bar;
- i) Fill time: Real time display of current inflation time;
- j) Stable time: display the current voltage stabilization time in real time;
- k) Test time: display the current test time in real time;
- l) Production: count how many times the tester has been tested since the first test;



If there is only one program, the starting program number and the ending program number should be the same number. To switch from the No. 0 program to the No. 1 program, you only need to change the starting program number and the ending program number of the test interface.

7. History

"History" contains the necessary data of all test results, a total of 100,000 records can be stored, if it exceeds, it will be automatically overwritten from front to back.

As shown in Figure 2-39, click the history, and enter the page as shown in Figure 2-40 Or Figure 2-41



Figure 2-39

[illegible]

Figure 2-40 Leak Test

[illegible]

Figure 2-41 Sealed Component

- a) Production: record the total number of products tested. For each test, the total number of products will automatically increase by 1;
- b) OK product: record the number of qualified products tested, it will be automatically increased by 1 after each test;
- c) OK rate: equal to qualified number/output statistics x100%;
- d) Time: the time of recording test results;
- e) Program: program number/program name to run during the test;
- f) NO./Bar code: When there is no bar code scanning, the product code is displayed; when there is a bar code input, the product bar code is displayed;
- g) Pressure: the test air pressure sampled during product testing;
- h) Leak: the product leakage pressure value calculated during product testing;
- i) BLeakMax: As shown in Figure 2-41, it indicates the value of the large leak of the product in pa.
- j) BLeakMin: As shown in Figure 2-41, it indicates the value of the small leak of the product, in pa;
- k) Result: if the test air pressure and leakage value are within the parameter range set in the test procedure, the test result is OK, otherwise it is NG;
- l) View: click "view" to pop up the picture shown in Figure 2-42. After making the corresponding settings, you can quickly find and browse the test history data of a certain time period you want to view;

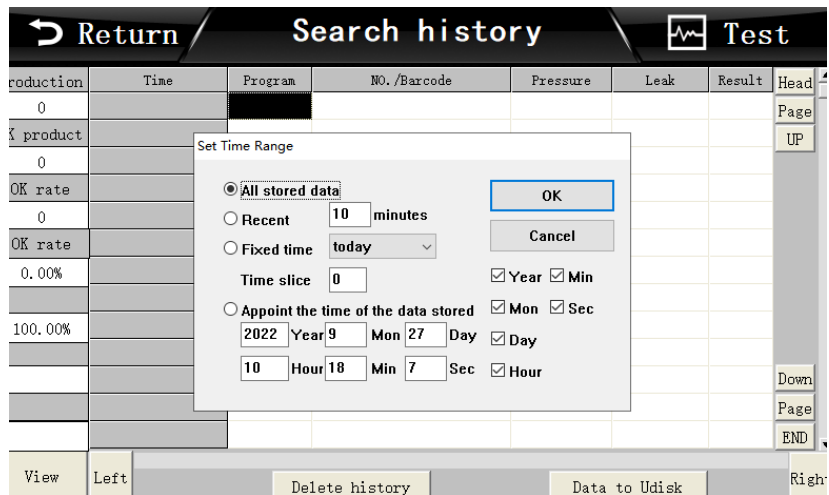


Figure 2-42

- m) Delete history: After clicking, the page shown in Figure 2-43 will appear, click "OK" to delete history ;

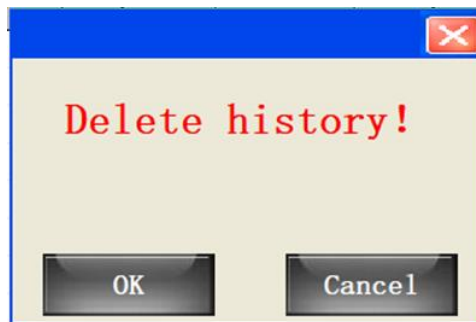


Figure 2-43

- n) Data to U disk: click it and the page shown in Figure 2-44 will appear. At this time, insert the USB flash disk into the USB interface, click Export History Record to the USB flash disk, and then wait 3 minutes to pull out the USB flash disk. At this time, the data export is completed, and the data can be opened for viewing and editing with EXCEL;

Note: USB flash disk only supports FAT32 format.

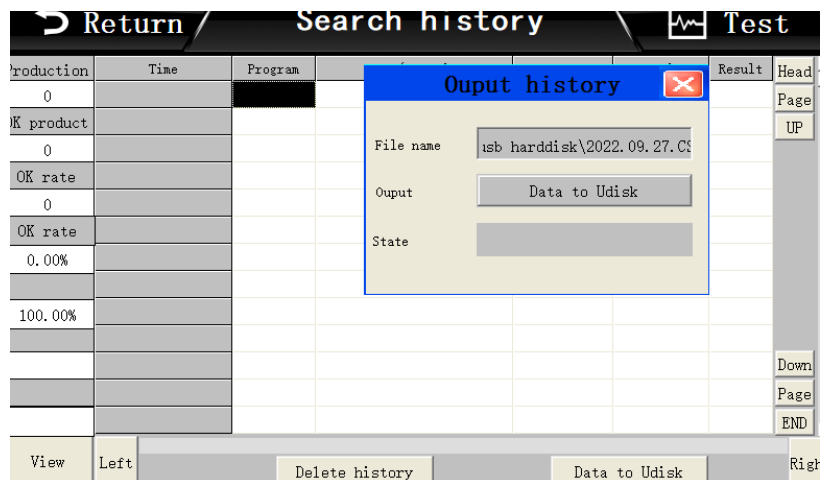


Figure 2-44

8. Bar code

As shown in Figure 2-45, it is the default screen after clicking bar code. The bar code function is not standard. If necessary, please contact our engineers.



Figure 2-45

9. Internet

Internet, as shown in Figure 2-46, suitable for communication with computers, If necessary, please contact our engineers.

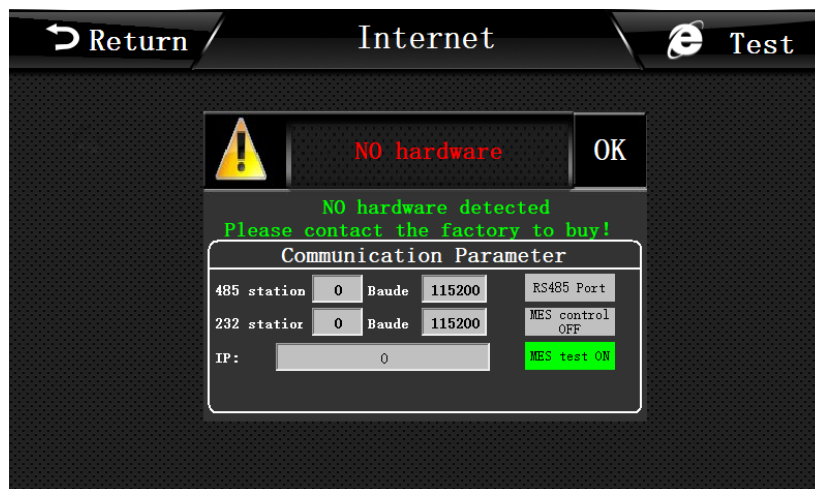


Figure 2-46

9.1 485modbus station

Modbus in the communication protocol, the communication station number of the equipment is set based on the upper computer.

9.2 232modbus station

Modbus in the communication protocol, the communication station number of the equipment is set based on the upper computer.

9.3 RS485 Port/communication network port

To select the communication method and network port communication, you need to communicate with the sales engineer of Hirays in advance to purchase the corresponding module.

9.4 MES control OFF/MES control ON

When the MES control is ON, the tester cannot be started, and the upper computer needs to give a start signal. This function needs to be controlled by the corresponding upper computer software.

9.5 IP address

When the device is configured with a network interface, this IP address is used to set the network port IP of the tester;

10. Factory mode

This mode can only be accessed by Hirays' engineers.

Chapter III、 Maintenance and repair

1. About tester maintenance

1.1 Test items every day

1.1.1 Check whether the power supply is abnormal after work

- a) Check whether the two ends of the power cord are firmly plugged in, otherwise the tester cannot be turned on. To prevent electric shock, resulting in personal accident.
- b) Press the power switch to check whether the power indicator light is on (red if it is on), it means that the power supply of the tester has been connected and the connection is correct. If it does not light up, please confirm whether the power cord is plugged in tightly, or the fuse is over current and burned out.

1.1.2 Check whether the air inlet pressure of the tester is normal


- a) Whether the air trachea of the air source and the connector of the tester are well connected, and whether there is air leakage between the air pipe of the air source and the air inlet connector of the tester
- b) After connecting the air inlet trachea, check whether the pointer of the air pressure gauge on the tester is greater than 0.6MPa. If it is not above 0.6MPa, adjust the three element pressure regulating valve of the tester and turn it clockwise. At the same time, observe whether the displayed value on the air pressure gauge is increasing. Adjust the air pressure to above 0.4MPa. If it is adjusted to the maximum, the air pressure still cannot be adjusted, please confirm the factory air source.
- c) Check whether there is water, oil or other foreign matters in the filter. If yes, please drain and clean them.

1.1.3 Check whether the test air pressure is normal

- a) The test air pressure is the air pressure inflated into the product or on the surface. The following assumes that the test method is direct testing, and the test pressure is positive pressure.
- b) Click the "Pre-Set" button on the touch screen, and the tester should be automatically entered the "Pre-Set" interface.
- c) Click the "Pressure regulator" button to see if the air pressure value displayed in the "Current Pressure" column is the test air pressure of the product.
- d) If the air pressure value displayed in the "Pressure" column is not the test air pressure of the product, please manually open the 'Tester Side Door', manually

twist the pressure regulating valve slightly, and observe the air pressure change in the " Pressure" column until the air pressure value displayed in the " Pressure" is the same as or slightly larger than the test air pressure required by the product.

- e) Close the "tester side door".


CAUTION

When the tester model is HC-BXXXX-XXA、HC-BXXXX-XXB high and low pressure or positive and negative pressure tester, the system adjusts the high pressure by default, and the low pressure needs to open the "System Parameters" interface to adjust the low pressure, turn on the "Y14" button, as shown in Figure 3-1, after turn on, the test air pressure of low pressure or negative pressure can be adjusted according to the above steps.

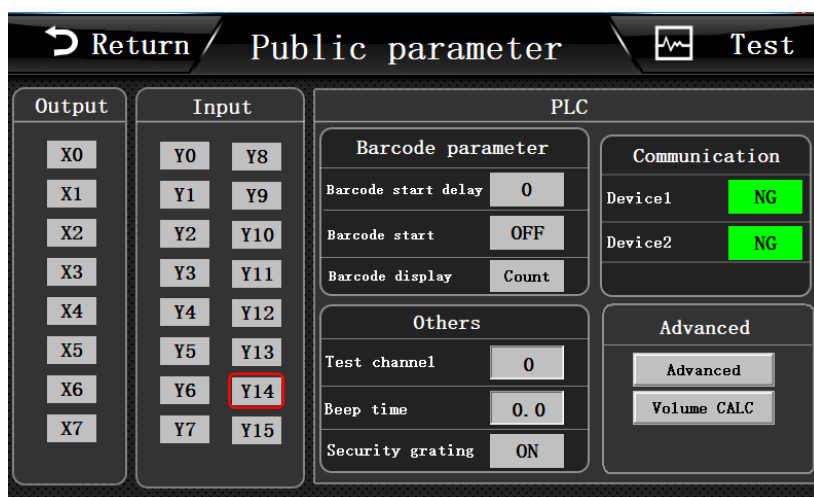


Figure 3-1

1.1.4 Check whether the inspection items can be detected

- a) The OK samples and NG samples will be tested separately to see if the test results correspond one by one.
- b) If the results do not match, please contact Hirays' engineers.

2. Abnormal faults and Countermeasures

The tester has its own troubleshooting function, which can be entered and eliminated in the following ways.

Step 1: Return to the main interface and click the "Support" button shown in the red box in Figure 3-2.



Figure 3-2

Step 2: Click the "Troubleshooting" button shown in the red box in Figure 3-3

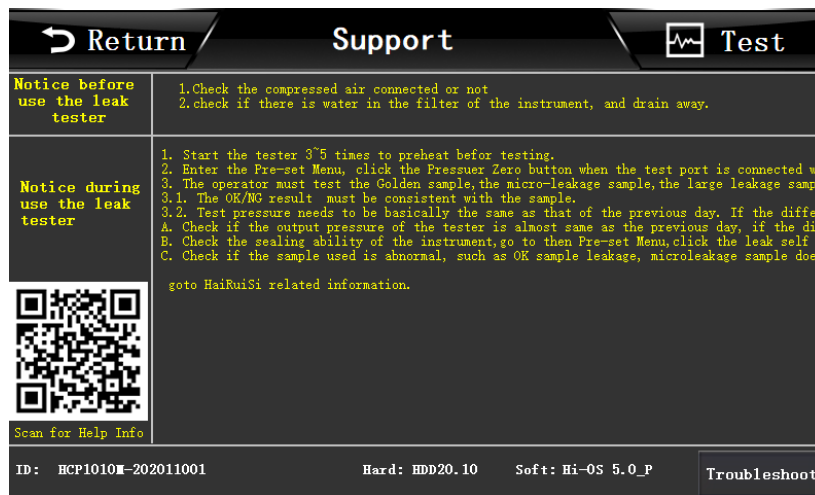


Figure 3-3

Step 3: Click the relevant fault detection button in Figure 3-4 to get the corresponding processing method;



Figure 3-4

2.1 When NG occurs frequently in the test

Please determine the causes in the following order and then implement the countermeasures.

2.1.1 No leak testing

Please test the tester for no leak after tying the test trachea. If there is no leak, it belongs to the reasons other than the differential pressure tester. Please confirm the following reasons.

2.1.2 Check the status of the fixture

Reason	countermeasure
Leakage of piping joints	Apply soap to the piping joint and pressurize it (keep it pressurized state) to confirm that there is no leakage. If there is a leak, replace the fitting and reconnect the piping.
Piping deformation	Replace the air trachea with material.
* If the above reasons are eliminated or the countermeasures are invalid, please confirm the next item.	

2.1.3 Check the state of the mold seal

Reason	countermeasure
Missing silicone seal	Replenish the new seal ring
Dirt or foreign matters on the surface	clean
The sealing material is damaged	Replace the seal ring
When the seal is unstable	Please confirm the following items and improve them if necessary. <ul style="list-style-type: none"> •whether the size and hardness of sealing materials is proper •whether gap between sealing material and the mold assembly is sufficient •Wear and tear of sealing materials •Whether the clamping force of the cylinder is too high or too low
*If the above reasons are excluded, or the countermeasures are invalid, please contact our sales engineer.	

2.1.4 Check environmental changes

Reason	countermeasure
Insufficient compressor power	Replace the high-power compressor.

Other pneumatic tools are used on the air source, resulting in unstable air pressure	Do not connect pneumatic tools such as air guns and pneumatic screwdrivers during the test, so as to supply stable air pressure.
The influence of the air from the air conditioner and fan blowing directly to the test product	Move the equipment to a place with relatively stable pressure and temperature
* If the above reasons are excluded, or the countermeasures are invalid, please contact our sales engineer.	

2.1.5 Check the state of the product to be tested

Reason	countermeasure
The temperature of the test product is higher or lower than the room temperature	The buffer station is added on the production line to make the temperature of the test article reach room temperature.
Product deformation during pressurization	Set blocks to prevent product deformation.
Air hole leakage or internal leakage	Check for leaks with soapy water or a water test If the leakage part cannot be found, it may be internal leakage. If leakage is confirmed, the production process needs to be improved.
Test product is wet	Improve drying process or add drying process
When the finished product was tested, the product structure resulted in the formation of the second and third cavities	Remove the second and third cavities that affect the test by improving the assembly process
* If the above reasons are excluded, or the countermeasures are invalid, please contact our sales engineer.	

2.2 History can't be derived

Please check whether the format of the U disk is correct, the High Precision Differential Pressure Tester only supports the U disk of FAT32.

2.3 Test result don't correspond to actual soaking test result

- Check whether the test pressure corresponds to the actual soaking depth and time;
- Check whether the mold and the product are completely sealed. If the product structure affects the sealing, please consider replacing the sealing method;
- Check whether the procedures and pressures used are those of the current product
- Others questions, please contact our sales engineer.

Chapter IV、 Quick programming

1. How to quickly choose the test method

- a) Enter the program parameter.
- b) Select the test type, there are two types of test, leak test and sealed component
- d) The test function has the following options:

Test type	Test function	Model	Status of the product to be tested
POSI/ Negative	leak test	Differential Pressure Tester	Semi- finished products or with air filling holes
POSI/ Negative	sealed component	Differential Pressure Tester	finished products without air filling holes

2. How to quickly set up a test program

2.1 Semi- finished products (with air filling holes)

- a) Choose the test type: Leak Test
- b) Choose the FillType: Standard
- c) According to the product to set the Auto Calibration
- d) Choose the additional function: Leak Signed, BigLeak
- e) Set test time parameters according to the product
- f) Set test pressure parameters according to the product
- g) Set Output according to product

2.2 finished products (without air filling holes)

- a) Choose the test type: Seald Component
- b) Choose the FillType: Standard
- c) According to the product to set the Auto Calibration
- d) Choose the additional function: Leak Signed, Volume
- e) Set test time parameters according to the product
- f) Set test pressure parameters according to the product
- g) Set Output according to product

2.3 Case description

2.3.1 How to set the test program for Watch middle frame with waterproof requirement of IP68

The test pressure is 50kpa; the program used is program 0;

Test Type	FillType	Additional function	Time parameter		Pressure parameter		Output parameter	
Leak Test ✓	Standard ✓	Leak Signed	item	time	item	time	Output	time
			Filling	5s	FillPress	50kpa	Before test 1	0.1s
	Auto	Volume	Stable	5s	PressMax	52kpa	Before test 2	3s
			Testing	10s	PressMin	49.8kpa	Before test 3	0s
Seald Component	Instruction	BigLeak✓	Exhaust	2s	LeakMax	80pa	Before test 4	0s
			Pre-fill	0s	LeakMin	-80pa	After test 1	0s
	Ramp/ Fixt Ramp		Fixture	0s	Offset	0	After test 2	0s
			Next	0	BLeakMax	0ml	After test 3	0s
Showed: ✓ Indicates that the current mode is choose;					BLeakMin	0ml	After test 4	0s
	Indicates output is on;				Volume	0ML		

Note: The selection procedure for Watch middle frame is: Leak Test, Standard, BigLeak ; time parameters and pressure parameter are as shown in the table above; output parameters are turned on, the output 1 and 2 before the test, the time is 0.1s and 3s respectively, indicating the situation is: after pressing the start button, the external output 1 starts to act after 0.1s (if the cylinder is connected, it starts to press down), and the safety light grid is valid within 3s;

The actual program settings are shown in Figure 4-1;



Figure 4-1

2.3.2 Whole Watch test

The test pressure is 20kpa; the program used is program 0;

Test Type	FillType	Additional function	Time parameter		Pressure parameter		Output parameter	
Leak Test	Standard ✓	Leak Signed	item	time	item	time	Output	time
			Filling	5s	FillPress	20kpa	Before test 1	0.1s
	Auto	Volume ✓	Stable	10s	PressMax	25kpa	Before test 2	2S
			Testing	5s	PressMin	15kpa	Before test 3	0s
Sealed Component ✓	Instruction	BigLeak	Exhaust	5s	LeakMax	50pa	Before test 4	0s
			Pre-fill	5s	LeakMin	-50pa	After test 1	0s
	Ramp/Fixture Ramp		Fixture	5s	Offset	0	After test 2	0s
			Next	0s	BLeakMax	100ml	After test 3	0s
Showed: ✓ Indicates that the current mode is choose;					BLeakMin	80ml	After test 4	0s
	Indicates output is on;				Volume			

Note: The selection program for the finished product of the whole watch is: Sealed Component, Standard, Volume ,time parameters and pressure parameters are as shown in the table above; output parameters are turned on, the output 1 and 2 before the test, the time is 0.1s and 2s respectively, indicating the situation is: after pressing the start button, the

output 1 starts to act after 0.1s (if the cylinder is connected, it starts to press down),the external output 2 starts to act after 2s (if the cylinder is connected, it starts to work) and the safety light grid is valid within 2s;

The actual program settings are shown in Figure 4-2;

The screenshot shows a software interface for testing. At the top, there are buttons for 'Return', 'NO.0', 'program0', 'Search', and 'Testing'. The main area is divided into several sections:

- Test type:** Includes 'Seald Component', 'FillType' (Standard), 'Auto Calibration' (Calibration Set), and 'Additional function' (Leak Signed, Volume).
- Time parameter:** A table with columns for parameter, value, and unit.

Parameter	Value	Unit
Filling	5	S
Stable time	10	S
Test time	5	S
Exhaust	3	S
Pre-fill	5	S
Fixture	5	S
BalanceT	0	S
Next	0	S
- Pressure parameter:** A table with columns for parameter, value, and unit.

Parameter	Value	Unit
FillPress	20	Pa
PressMax	25	Pa
LeakMax	15	Pa
PressMin	50	Pa
LeakMin	-50	Pa
Offset	0	Pa
BLeakMin	100	ML
BLeakMax	80	ML
Volume	0	ML
- Output:** A table with columns for status, value, and unit.

Status	Value	Unit
ON	0.1	S
ON	2	S
ON	0	S
ON	0	S
OFF	0	S
OFF	0	S
OFF	0	S
OFF	0	S

At the bottom, there are buttons for 'Previous', 'Super reset', 'Save', 'Save as', and 'Next'.

Figure 4-2

3. How to determine the criteria for product waterproof testing

3.1 No standard leakage value and unknown whether product is OK or NG

When there is no standard for product leakage, scientific analysis method must be used for judgment. That is, a sufficient number of samples are selected for air leakage test and water soaking test. According to the data and phenomena of the two, the data of product OK and NG are obtained.

The specific method is as follows:

- Confirm the waterproof level of the product;
- Select 100 suitable products (To appropriately increase if 100 can't be determined);
- Number each product from No. 1 to No. 100;
- Use our air leakage tester to test each product, and clear the history before testing.
- According to the leak and the test air pressure, the test data are divided into three groups: group A with small leak, group B with medium leak, and group C with large leak.
- The products of group A are soaked in water, and the judgment standard is obtained according to the test results;
- If all the products in group A pass the water soaking test, then the products in group B are also subjected to the soaking test to find the critical values of OK and NG;

3.2 Known product OK and NG, but do not know leakage value

- a) Repeatedly test the OK products and NG products ten times, and find out the value A with the largest leak among the OK products according to the historical records;
- b) Repeatedly test the OK products and NG products ten times, and find out the value B with the smallest leak among the OK products according to the historical records;
- c) Take the value C as the judgment standard, $c = \frac{a+b}{2}$;



When looking for the judgment standard, the air leakage test and the water soaking test, the state of the product should be the same, otherwise there will be a misjudgment!

Common errors:

- a) No attention was paid to the waterproof breathable membrane. During the water soaking test, the product was pasted with a waterproof and breathable film, but during the air leakage test, the product was not sealed with the waterproof breathable film, resulting in misjudgment;
- b) The order of precedence was not noted. First do the soaking test, then do the air leakage test. This will cause the tester to fail to test when the product has a slight leak. Because the water has tension, it will block the product gap.
- c) Not meeting the corresponding standards. During the soaking test, the required time and depth were not reached. For example, IPX7 requires 1M water depth, soaking for 30 minutes, but only 2 minutes and 0.4M. This will cause inaccurate experimental data and misjudgment of the product!
- d) Proper water temperature is not used. When soaking in water, the water temperature must be 20-25° at room temperature.
- e) Not use the same program and inlet pressure. When the inlet pressure is changed during the test, it will have a great impact on the results. At the same time, the inlet time, voltage stabilization time and test time cannot be changed. It is necessary to ensure that all

Chapter V、 Waterproof testing knowledge

1. IP Introduction of waterproof level and corresponding air pressure


1.1 IP waterproof level

The protection grade adopts the IPXX grade standard recommended by the International Electro technical Commission (IEC). Different installation places have different grades. For details, please refer to the table below. In the grade standard, XX is a two-digit number, the first one indicates the protection level of the product against solids, and the second one indicates the protection level against liquids. The solid protection level has 7 levels, which are represented by 0-6; the liquid protection level has 9 levels, which are represented by 0-8 respectively.

Dust proof level	Protection standards	waterproof level	Protection standards
0 level	unprotected	0 level	unprotected
1 level	Prevent large solids from entering	1 level	Water droplets falling vertically have no harmful effect on the product
2 level	Prevent medium sized solids from entering	2 level	When the product is tilted 15°, water droplets drip onto the product, and the product has no effect
3 level	Prevent small solids from entering	3 level	Water or rain falls on the product at 60°angle from the vertical, and the product has no effect
4 level	Prevent solids larger than 1mm from entering	4 level	The liquid splashes on the product from any direction, and the product has no effect
5 level	Prevent harmful dust from entering	5 level	The product is sprayed with water in any direction, without any damage
6 level	Completely prevent dust from entering	6 level	The product is directly sprayed by water in any direction, and the water will not enter the product
		7 level	Can be soaked in water in a short time (1m,30min)
		8 level	This standard is more stringent than IPX7, and the water depth is deeper

1.2 IPXX waterproof level reference corresponding air pressure

waterproof level	Reference corresponding air pressure	Reference test air pressure
IPX5	$\approx 3-5\text{kpa}$	3-5kpa
IPX6	$\approx 5-8\text{kpa}$	5-8kpa
IPX7	$\approx 10\text{kpa}$	12-15kpa
IPX8	$\approx 20-500\text{kpa}$	20-500kpa

**CAUTION**

The above air pressure is the reference air pressure and does not represent the actual test air pressure. For the actual test pressure, please consult our engineers.

2. Definition of various pressures

2.1 Relative pressure and absolute pressure

- a) Relative pressure: the difference from the current atmospheric pressure
- b) Absolute pressure: the pressure value calculated from the absolute vacuum;
- c) Standard atmospheric pressure: is the pressure at sea level under standard atmospheric conditions, which is 101.325kpa;

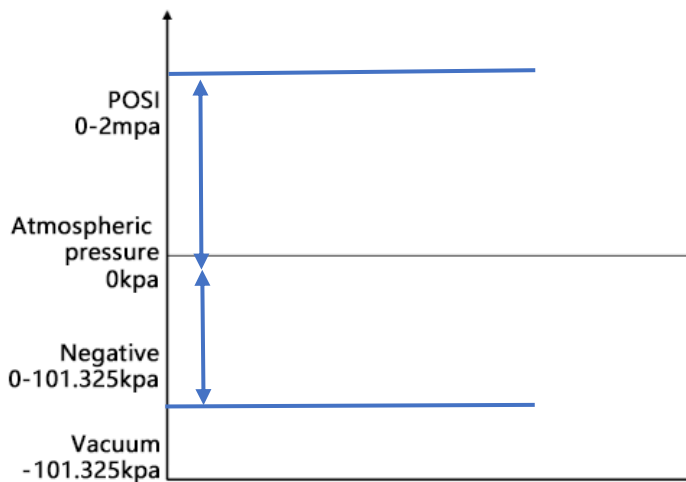


Figure 5-1

Atmospheric pressure: pressure formed due to irregular movement of air;

Characteristics of atmospheric pressure: with the increase of altitude, the atmospheric pressure will gradually decrease; The atmospheric pressure decreases by 100pa for every 10m above sea level, and the difference between the atmospheric pressure in Shenzhen by the sea and that in Guiyang mountain area in Guizhou is 10kpa;

As shown in Figure 5-2, it is the characteristic diagram of atmospheric pressure.

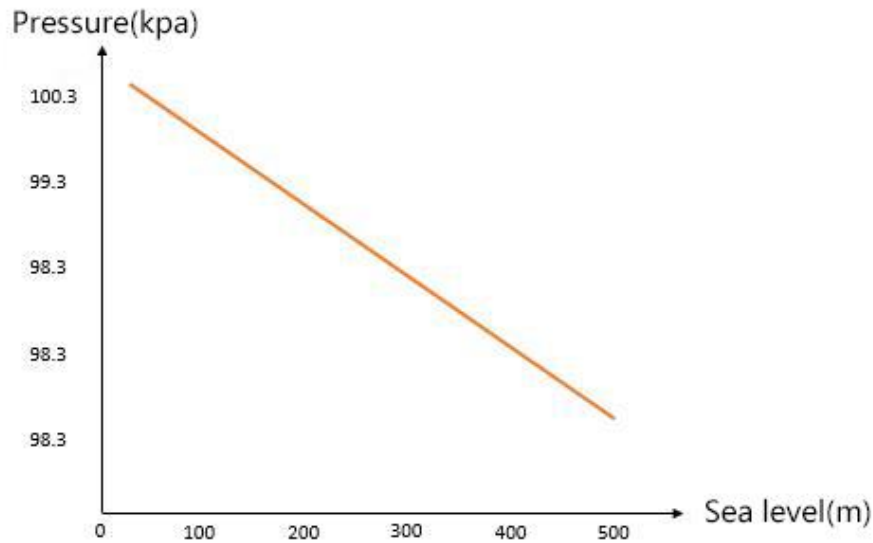


Figure 5-2

2.2 Positive pressure、 negative pressure、 engineering

atmospheric pressure, standard atmospheric pressure

Positive pressure: The pressure higher than the current atmospheric pressure is positive pressure;

Negative pressure: The negative pressure is lower than the current atmospheric pressure and higher than the absolute vacuum, and the maximum negative pressure is -101.325Kpa;

Engineering atmospheric pressure: One kilogram of force per square centimeter is an engineering atmospheric pressure, and $1\text{kg/cm}^2=98.0655\text{Kpa}$ is an engineering atmospheric pressure;

Standard atmospheric pressure: symbol is atm, $1\text{atm}=101.325\text{kpa}$;

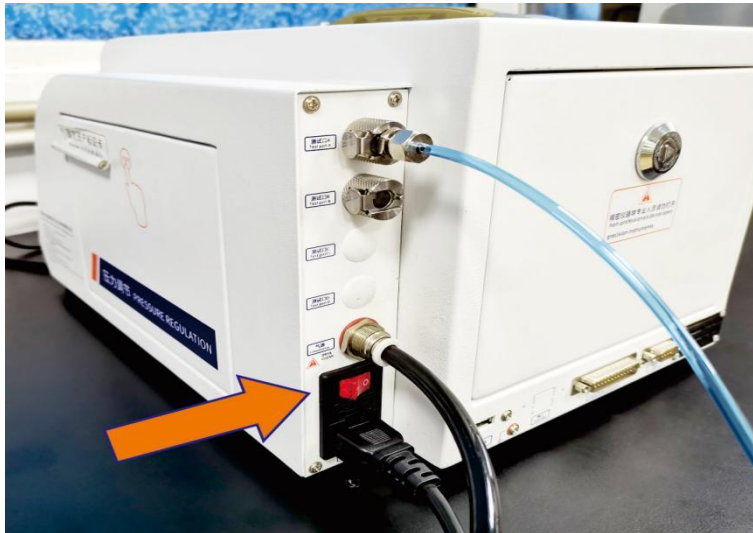
Chapter VI some suggestions on SOP

1. What is SOP?

SOP is the capital of the first letter of the three words Standard Operating Procedure, that is, standard operating procedure, which refers to the description of the standard operating procedures and requirements of an event in a unified format, which is used to guide and standardize daily work. SOP is to refine and quantify the key control points in a program.

2. SOP writing model

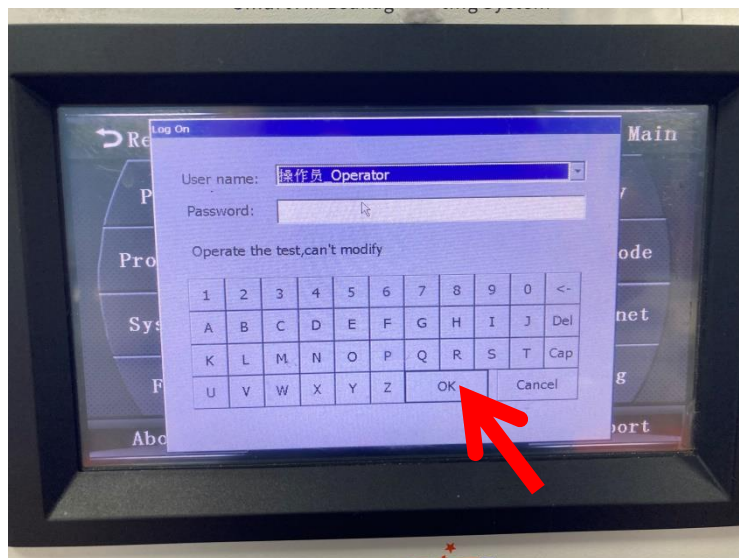
XXX Project	
Standard Operating Procedure	
Process name: test the air leakage of XX Effective date: Aug 11, 2021 Version No.: V1.10.2	Written by (modifier): XXX Pages: 8 in total
1.0 Purpose It is intended to assist the operator in correctly operating the air leakage tester to accurately measure the qualified and unqualified products.	
2.0 Responsibilities 2.1 The writer is responsible for the effectiveness of the program. 2.2 The operator is responsible for the correctness of the daily operating procedures.	
3.0 Scope Applicable to the air leakage test of XXX project and XXX station.	
4.0 Procedure; 4.1 Start up As shown in the figure, turn on the power switch of the tester.	



4.2 User Log

As shown in the figure, click "User Log" (the operation screen of this tester is a resistance screen, please click with your fingernail), select the user name as "Operator", enter the password "8888" and click OK, that is, the tester is logged in.





4.3 Calibration test pressure

Click "Pre-Set ", Check whether the current pressure is within the setting range. If not, adjust the right regulator valve to the appropriate pressure.

4.4 Check product before test

Check products before test are used to confirm that the whole test system has no problems. The specific spot check methods are as follows:

4.4.1

- a) Put the qualified products with green marks into the mold for normal testing, the output result of the tester is OK and the green light is on.
- b) Put the yellow marked micro leak/small leak products into the mold for normal testing, the output of the tester is NG, and the red light is on.
- c) Put the large leakage product marked in red into the mold for normal testing, the output result of the tester is NG, and the red light is displayed.
- d) In the check before test of the above three products, the judgment result of the tester corresponds to the actual result one by one, and the test can be started normally. If not, please contact the relevant personnel immediately

4.5 Placement of OK and NG items after normal testing

Put OK products on the green tray and NG products on the red tray.

5.0 Maintenance

5.1 Before going to work every day, carefully clean the blue sealing silica gel or orange sealing rubber ring with alcohol until there is no dust or dirt on the surface;

5.2 Equipment maintenance man should check whether the pressure of the tooling is within the set range every day, and whether there is too much water in the filter of the tooling and the tester.

6.0 Accessories

Materials required	QTY
Products without leakage and with green label	1PCS
Products with slight leakage and yellow label	1PCS
Products with large leakage and red label	1PCS

Quality Department (approval): XXX

Date: 2021.8.18

Project Manager (Approval): XXX

Date: 2021.9.19



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