



PN-BSM600F/160F Paperboard/Paper Burst Tester

USER MANUAL



HANGZHOU PNSHAR TECHNOLOGY CO.,LTD.

The cover image is for reference only, please read this manual carefully before use and keep

it for future reference.

Preface

Thank you for choosing PNSHAR products. To ensure safety and best performance, please read the following instructions carefully. Incorrect installation and use may cause product damage or safety hazards.

PNSHAR follows the principle of continuous development, and sorry for cannot notify you the subsequent product upgrades or user manual changes, and the upgraded products will be operated in accordance with the new user manual.

Any modification to the product is strictly prohibited! PNSHAR will not assume any responsibility for any problems or accidents caused by unauthorized modification.

PNSHAR promises that each product is produced in strict accordance with the company's process and quality management system. During the product warranty period, if there is any non-human problems that affect normal use, PNSHAR will repair the defective products free after confirmation. For products beyond the warranty period, our company provides chargeable maintenance services for life.

PNSHAR's registered trademark is



HANGZHOU PNSHAR TECHNOLOGY CO.,LTD

2020.12

Please read the following safety precautions carefully before use

Safety precautions introduce important contents related to safety, please be sure to follow them. Safety matters are divided into "danger" and "caution". The meaning is as follows:

Mark	Name	Description
	Danger	There is a danger that may cause damage to the product or personal injury or death.
	Caution	There are problems that may affect normal use.



- This product is not an explosion-proof product, and it is forbidden to use it in an environment with flammable or explosive gas.
- Do not spill water on the product. If water enters the product accidentally, please cut off the power immediately and stop using it.
- If the product is found broken or deformed when unpacking, please do not use it.



- Before using this tester, please read this manual carefully.
- Please use tester in an indoor environment.
- Use a dry cloth to wipe the dust on the tester, do not use alcohol, gasoline or other organic solvents.
- To extend the tester service life, please maintain it regularly.

Content

Preface	1
Content	3
Chapter 1 Precautions for tester Installation	4
Chapter 2 Brief tester operating procedures	5
Chapter 3 Introduction	6
Chapter 4 Tester structure diagram.....	8
Chapter 6. Main Parameter.....	10
Chapter 7 Operating System Diagram	11
7.1 Operation keys	11
7.2 [Test] interface.....	13
7.3 [Data center] interface	13
7.4 [Setting] interface	14
7.5 [Support] Interface.....	20
Chapter 8 Test.....	22
8.1 Power on.....	22
8.2 Sample information setting.....	23
8.3 Adjust sample clamping force	23
8.4 Sampling and treatment	24
8.5 Test	24
8.6 Testing result processing.....	27
Chapter 9 Tester Calibration and Maintenance	30
9.1 Hydraulic system calibration	30
9.2 Changing rubber film.....	32
9.3 Rubber film resistance checking	34
9.4 Coaxiality check	35
9.5 Silicone oil replacement	35
9.6 Maintenance of transmission parts.....	36
9.7 Screen calibration	37
Chapter 10 Intelligent Information Network Connection.....	38
10.1 Wireless network connection	38
10.2 Other forms of connection.....	38
Chapter 11 Trouble shooting	40
Chapter 12 Packing List.....	42

Chapter 1 Precautions for tester Installation

- Before testing each day, please turn on the power to warm up for 10-30 minutes.
- The protective ground wire of the power supply must be reliably connected to the ground, otherwise the tester cover may be electriferous and the tester be electrostatically interfered.
- Once the product is out of control, turn off the power immediately.



The time interval between turning the power switch off and on again must exceed 20 seconds.

Chapter 2 Brief tester operating procedures

1. Power on

Turn on the power, warm up for 10~30 minutes.

2. Choose testing mode

There are two working modes: single test and multiple continuous tests.

The default is [Single Test] mode.

If the parameter of [Self-Test Times] is set to a non-zero value, it will automatically switch to [Multiple Tests] working mode.

3. Parameters setting

Generally, the test can be performed without modifying the parameters. If the paper burst index test is performed, the actual sample grammage must be input ([Parameter Setting]→[grammage]).

4. Clamping force adjusting

Pull up the pressure regulating valve knob cap gently, adjust to the appropriate air pressure value according to different test conditions, and then lock the knob back.

5. Placing the sample

Place the prepared sample (the recommended size is larger than the outer diameter of the platen) in the middle of the lower platen.

6. Testing

Click the test button  on the touch screen or the metal button [Test] to start the test. the test process displays the burst strength value, time and curve in real time. the test ends and resets after the sample is burst, and the test result is displayed on the screen.

7. Data query, statistics and printing

Each screen displays 10 sets of test data. Data printing is divided into single printing and statistical printing. Select one of the data for single printing. unselect it or press the key  and then press the key  for statistical printing.

8. Power off

Turn off the power switch.

Chapter 3 Introduction

PN-BSM series burst tester is an international universal Mullen type tester, which has two models: paperboard burst tester and paper burst tester.

The PN-BSM600F paperboard burst tester is suitable for all paperboards (including corrugated board and paperboard) with a burst strength value of not more than 5500kPa, and it is also suitable for non-paper materials such as silk and cotton. Its performance and technical parameters comply with GB/T 1539

and ISO 2759.

PN-BSM160F Paper Bursting Tester is suitable for single-layer or multi-layer paper not greater than 1400kPa, but not suitable for measuring composite materials (such as corrugated cardboard or liner cardboard). Its performance and technical parameters comply with GB/T 454 and ISO 2758.

Working principle: Place the sample on the elastic film and clamp the periphery of the sample tightly to make it bulge freely with the film. When the hydraulic fluid is pumped in at a stable rate to make the film bulge until the sample ruptures, the maximum pressure applied is the burst strength of the sample. The measurement and control system automatically records the maximum burst strength value, and calculates and displays the results.

Main technical features:

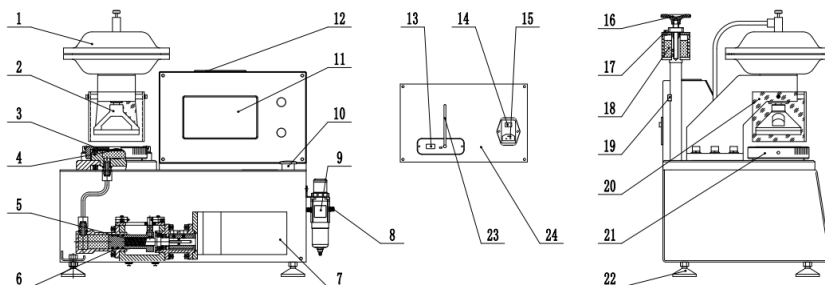
1. Adopt new module circuit design, with WIFI IOT function. After networking, the test results can be saved to the cloud server, through the dedicated PN-QMS series quality management system, data query, management, reporting, big data analysis and statistics, and visual large-screen display can be performed.
2. With emergency stop button, it has alarm safety protection functions such as no sample, upper limit of the film, and over-range.
3. The sample clamping force can be adjusted, and the preset parameters can realize one-key testing.
4. Optimize the test procedure, realize rapid test and improve test efficiency.

5. With curve and bar graph display function, it is convenient to check the test results.

6. The unit can be switched: kPa, kgf/cm², lbf/in². multi-language operating system switching.

7. It can be connected to special computer test software, real-time display of the burst test curve, massive test data storage and query, management, analysis, statistics, reports and other functions.

Chapter 4 Tester structure diagram



1—Air Cylinder	2—Upper platen	3—Lower platen	4—Rubber film
5—Screw rod	6—Piston rod	7—Motor	8—Air inlet
9—Pressure	10—Emergency stop	11—Display	12—Printer
13—Serial port	14—Power switch	15—Power socket	16—oil cup handle
17—oil filling hole	18—oil cup	19—calibration hole	20—protective cover
21—compression	22—feet	23—antenna	24—rear cover

Chapter 5 Standard basis

This tester complies to the following standard

1. Paper burst tester:

GB/T 454、ISO 2758、TAPPI T403。

2. Paperboard burst tester:

GB/T 1539、GB/T 6545、QB/T 1057、ISO 2759、TAPPI T810。

Chapter 6. Main Parameter

Item	PN-BSM160F	PN-BSM600F
Power Supply	AC110~220 V $\pm$ 10 % 2 A 50/60 Hz	
Indication Error	$\pm$ 0.5% FS	
Indication variability	$\leq$ 0.5%	
Resolution	0.1 kPa	
Testing range	$\leq$ 1400 kPa	$\leq$ 5500 kPa
Pumping rate	(95 $\pm$ 5)mL/min	(170 $\pm$ 15)mL/min
Upper platen	inner diameter: 30.5 $\pm$ 0.1mm; out diameter: $\geq$ 48 mm	inner diameter: 31.5 $\pm$ 0.1mm; out diameter: $\geq$ 96 mm
Lower platen	inner diameter: 33.1 $\pm$ 0.1mm out diameter: $\geq$ 50 mm	inner diameter: 31.5 $\pm$ 0.1mm out diameter: $\geq$ 96 mm
Clamping	$\leq$ 1200kPa	
Rubber resistance	(9 $\pm$ 0.2)mm:	(10 $\pm$ 0.2)mm:
Air supply	Rated pressure (0.6 ~ 0.8) MPa Displacement (0.02 ~ 0.3) m ³ /min	
System tightness	1min Internal pressure drop $\leq$ 10% FS	
HMI	7"color touch screen	
Pinter	Modular integrated thermal printer	
Communication	WIFI、RS232(Standard) / USB (Optional)	
working environment	Indoor temperature 10°C ~ 30°C. relative humidity $\leq$ 80%	
Dimension	(535 × 365 × 585) mm (L×W×H)	
Weight	about 68 kg	

Chapter 7 Operating System Diagram

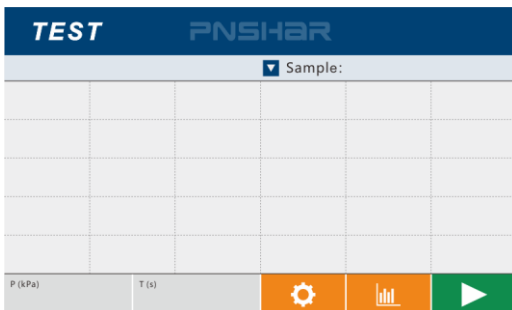
7.1 Operation keys

Image	Name	Function
	[Testing Center] Centro de Pruebas	Test main interface Interfaz principal de Prueba
	[Data Center] Centro de Datos	Bar graph display interface, switch to bar graph mode Interfaz de visualización de gráfico de barras, cambiar al modo de gráfico de barras
	[Testing Curve] Curva de Pruebas	Curve display interface, switch to single test curve and data Interfaz de visualización de curvas, cambio a curva de prueba única y datos
	[Setting Center] Centro de Configuración	Switch to the parameter setting, system function, technical support interface. Cambiar a la configuración de parámetros, función del sistema, interfaz de soporte técnico.
	[Parameter Setting] Configuración de parámetros	Various main test parameter setting interface Interfaz de configuración de varios parámetros de pruebas principales
	[System Function] [Función del sistema]	System function interface Interfaz de funciones del sistema
	[System Parameters] Parámetros del sistema	Various main system parameter setting interface Interfaz de configuración de varios parámetros principales del sistema
	[More Setting] Más Configuraciones	Other function switch setting interface Interfaz de configuración de otros interruptores de funciones
	[Optional] Opcional	Testing parameter setting interface Interfaz de configuración de parámetros de prueba
	[Tester Calibration] Calibración del comprobador	Tester measurement and control system calibration interface Interfaz de calibración del sistema de medición y control del comprobador
	[Technical Support] Soporte técnico	Product service technical support interface Interfaz de asistencia técnica del servicio de productos

	[Statistics Button] Botón de estadísticas	Average / maximum / minimum, standard deviation, coefficient of variation interface Media / máximo / mínimo, desviación estándar, coeficiente de variación interfaz
	[Delete] Borrar	Delete data (choose) or clear data (not choose) Borrar datos (Seleccionados) o borrar datos (no seleccionados)
	[Print] Imprimir	Single printing (selected) and statistical printing (not selected) Impresión única (seleccionada) e impresión estadística (no seleccionada)
	[Save] Borrar	Save the settings Guardar las configuraciones
	[Test] Prueba	Start to test Empezar la prueba
	[Stop] Detener	Stop testing Detener la prueba
	[Back] Regresar	Return to the previous Regresar a la pantalla anterior
	[Page turning button] Botón de cambio de página	Data center, test data page turning Centro de datos, cambio de página de datos de prueba
	[Selection instructions] Selección de instrucciones	To enable the feature Para activar la función
	[Selection instructions] Selección de instrucciones	To enable the feature Para activar la función

7.2 [Test] interface

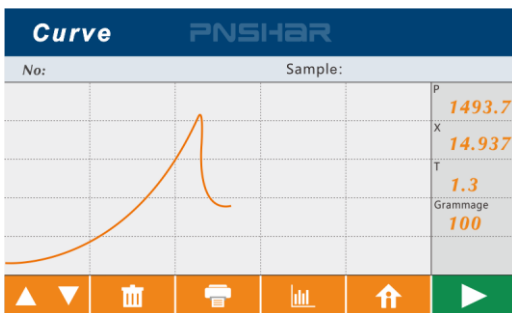
Power on, the main interface of [Test] is displayed after the self-check is completed.



7.3 [Data center] interface

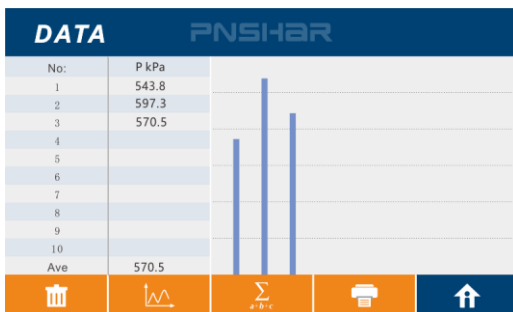
(1) [Data]-[Curve] Curve Interface

In the test [curve] interface of [Data], single test data and curves are displayed.



(2) [Data] Bar graph Interface

In the [Test] interface, click the key  to enter the [Data] bar graph interface, displaying multiple test data and bar graph.



7.4 [Setting] interface

(1) [Parameter setting] interface

In [Test] interface, click button  to enter the [Parameter Setting] interface, which mainly has the following parameters or functions: Test angle, test time, V(back)-return speed, initial load, bending length and parameter saving.

The screenshot shows the 'PARAM.' interface with the 'PNSHAR' logo. It features a grid of 8 parameter settings arranged in 2 rows and 4 columns. The parameters are: Drop Ratio (%), Grammage (g/m²), Film Para. (kPa), Clamp Time (s), Initial Load (kPa), Auto Test Num, Auto Test Delay (s), and Save. At the bottom, there is a navigation bar with four icons: a document with a pencil, a calendar, a person, and a home arrow.

Drop Ratio	Grammage	Film Para.	Clamp Time
%	g/m ²	kPa	s
Initial Load	Auto Test Num	Auto Test Delay	Save
kPa		s	

1) [Drop ratio]

The drop ratio is an important parameter for judging whether the test is over. Please do not modify it at will, it will affect the normal test. The default is 85%, which means the test ends when the pressure drops from the maximum value to

85% during the test (for example, the maximum pressure during a test is 1000kPa, and the test ends when the pressure drops to 850kPa).

2) **[Grammage]**

Grammage represents the weight per unit area of the sample, unit in g/ m², which is used to calculate the paper burst index.

3) **[Film para.]**

The film parameters are related to the alarm “Error in no sample”. When the hydraulic system is pressurized to a certain position, if the pressure value is less than the set value, it will prompt the alarm for “Error in no sample”. Do not modify it at will. If need to modify the film parameters, please refer to the instructions in the chapter of replacing the film. If want to cancel the alarm function, you can set the film parameter to 0, which will not affect the test result.

4) **[Clamping time]**

The time from when the upper platen is pressed down to the start of the hydraulic system, in seconds (s).

5) **[Initial load]**

Start to display the minimum pressure value of the test curve.

6) **[Auto-test Num]**

It is used for continuous multiple test mode. if it is set to 10, it will automatically

test 10 times continuously. if this value is set to 0, it will be the default single test mode.

7) [Auto-test delay]

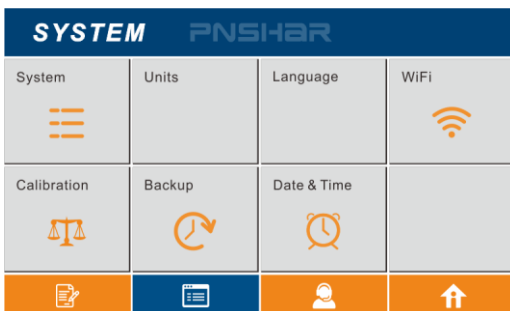
The time interval between consecutive tests.

8) [Parameter saving]

The modified parameters will take effect immediately. **If you do not save the parameters, the parameters will be restored to the last saved values when you turn on the machine next time.** The parameter save password is "1253".

(2) [System] interface

In the [Test] interface, click the key  to enter the [System] interface, which has the following parameters or functions: system parameters, unit switching, language selection, network settings, tester calibration, backup recovery, and time settings.



1) [System parameters]

Do not modify any parameter in this interface at will, otherwise the tester may malfunction!

System PMSHAR			
01.kf	02.kp	03.kr	04.MF
05.MS	06.LD	07.HT	08.FR
09.AD	10.EC	11.TF	12.DT
13.TC			
ID	VS		

➤ [More]

In the [Parameters] interface, press the key  to enable other function switches. Do not modify at will, otherwise the tester may have problem!

More PMSHAR			
01. Enable Motor Release	02. Enable Hold Time	03. Enable Drop Ratio	04. Enable Slope
05. Connect MTS	06. Connect ERP	07. Enhanced AD Filtering	08. Zero Tracking
09. Connect Lims			

2) [Units]

The tester has 3 units: kPa、kgf/cm²、lbf/in²。

✧ $1 \text{ kgf/cm}^2 = 98.0665 \text{ kPa} = 14.223344 \text{ lbf/in}^2$

✧ $1 \text{ kPa} = 0.010197162 \text{ kgf/cm}^2 = 0.14503774 \text{ lbf/in}^2$

✧ $1 \text{ lb/in}^2 = 0.070306955 \text{ kgf/cm}^2 = 6.894757 \text{ kPa}$



indicates the selected unit.

3) [Language]

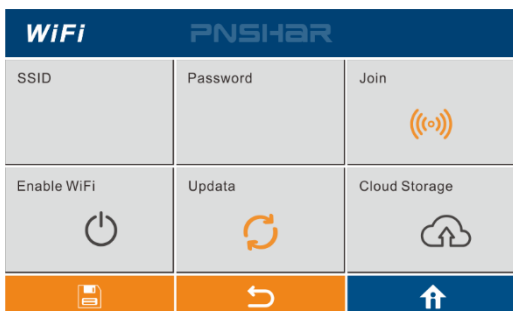
The system has two languages for your choice. The tester needs to be restarted after the language switch.



indicates the selected language.

4) 【WiFi】

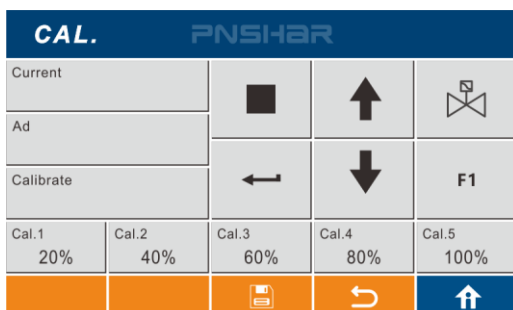
Wireless WiFi network connection setting interface (only 2.4G WiFi network is supported).



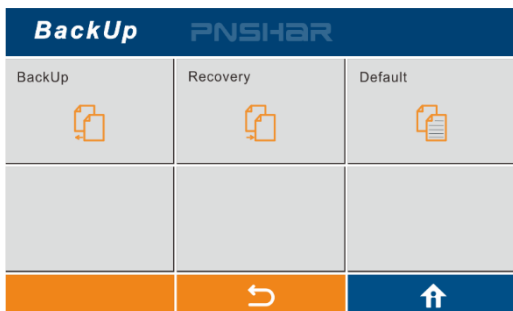
- ◆ **SSID:** the user name of the wireless network.
- ◆ **Password:** the password of the wireless network.
- ◆ **Join:** After entering the network name and key, click [Connect to the network] to connect to the network.
- ◆ **Enable WiFi:** black means not to enable, orange means to enable network.
- ◆ **Updates:** update the system software under the network status (**please do it under the guidance of our professional staff!**).
- ◆ **Cloud Storage:** black means not enabled, while orange icon means that the data cloud storage function is on, and the test data will be saved automatically to the cloud server.

5) [Calibration]

The tester should be calibrated regularly as needed. The recommended calibration period is one year. See chapter 9 for details.



6) [Backup]



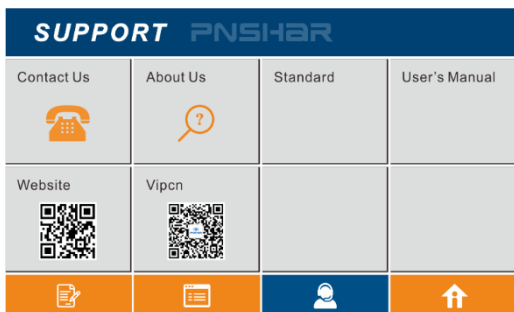
- ◆ **Backup:** backup current parameters to the system backup area. Click the [Backup] button, enter the password "1263", and prompt "Operation Complete" to complete the backup parameters.
- ◆ **Recovery:** Overwrite the current parameters with the backed parameters. Click the [Recovery] button, enter the password "1263", and prompt "Please restart the tester" to complete the restoration of parameters.
- ◆ **Default:** tester production debugging parameters, **users should not operate!**

7) [Time]

Modify system time and date, input format: year + month + day + hour + minute + second. Enter the date and time in the pop-up number input dialog box, click [Enter] to confirm, and [ESC] to cancel.

7.5 [Support] Interface

In the [Test Center], press  →  button to enter the [Support] interface to obtain related manuals, operation videos or related information.



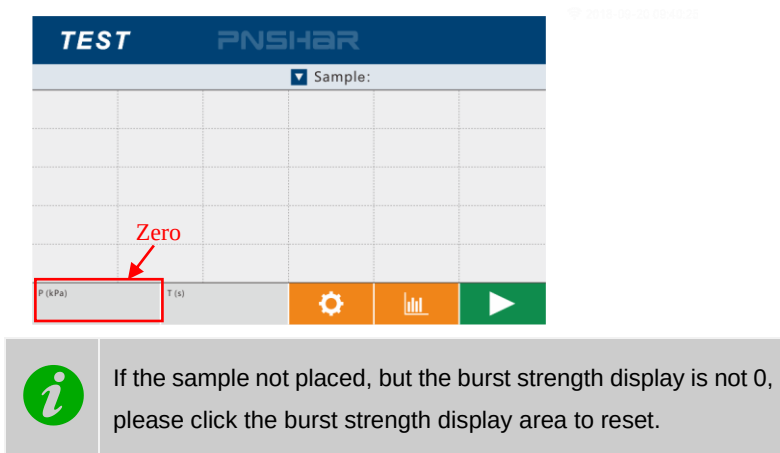
Chapter 8 Test

8.1 Power on

Turn on the power of the tester and the system self-checks as shown in the figure below:



After the self-check is completed, enter the [Test] interface, as shown in the figure below:



8.2 Sample information setting

In the [Test] interface, click the button  on the left side of the [Sample] to display company information, tester, remarks and return, and click the corresponding option to operate.



The screenshot shows the 'TEST' interface with the 'PNSHAR' logo. A 'Sample:' dropdown menu is open, displaying four options: 'Company', 'Tester', 'Remark', and 'Return'. Below the dropdown, there are input fields for 'P (kPa)' and 'T (s)'. At the bottom, there are three buttons: a settings gear icon, a bar chart icon, and a green play button icon.

- ✧ **Sample:** the number of the tested sample (within 16 English characters or numbers).
- ✧ **Company:** company name (less than 16 English characters or numbers)
- ✧ **Tester:** Operator's name (less than 8 English characters or numbers).
- ✧ **Remarks:** Other remarks (less than 8 English characters or numbers).
- ✧ **Return:** Exit

8.3 Adjust sample clamping force

Connect the air supply of the tester, pull out the knob cap of the pressure regulating valve (9) upwards, and adjust the clamping force (clockwise increases, counterclockwise decreases). Table 1 below gives the reference value of suitable platen pressure required for materials with different bursting resistance.

Table 1

Item	Burst strength(kPa)	Clamping force(kPa)	Air pressure (MPa)
1	< 1500	400	0.25
2	1500 ~ 2000	600	0.35
3	2000 ~ 2500	800	0.45
4	> 2500	1000	0.5



The air pressure range of the burst tester is (0.6 ~ 0.8) MPa.

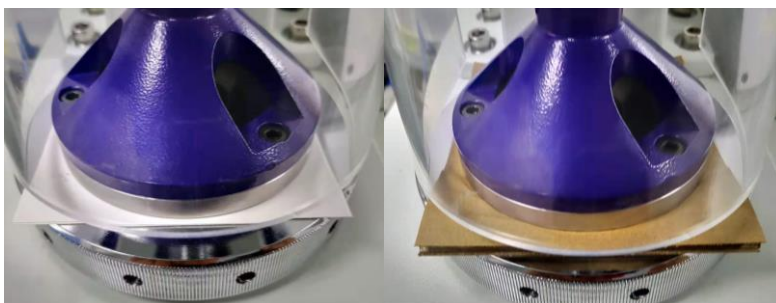
8.4 Sampling and treatment

The sample is taken according to ISO 186, and the treatment is according to ISO 187.

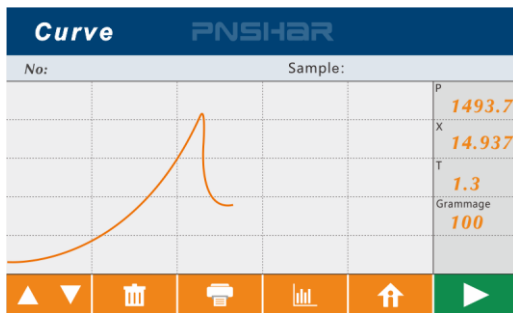
8.5 Test

(1) Manual single test

Place the prepared sample in the middle of the lower platen of the burst tester.



Click the test button  on the touch screen or the metal button [Test] to start the test. During the test, the burst strength value, test time and force-time curve are displayed in real time. After the sample is burst, the test ends and resets, and the test calculation result is displayed on the screen. As shown below



(2) Manual multiple test

According to the above step, carry out the test of multiple samples. The tester can save the test results of 20 samples at most, and if there are more than 20, the latest 20 test results will be saved.

(3) Automatic multiple test

[Parameter setting]-[Self-test times] If set to 10, the automatic multiple test mode will be activated. Click the test button  on the touch screen or the metal button [Test] to start. After the tester completes one test, please change to the next test point within the time of [Self-Test Delay]. The tester stops after 10 consecutive tests.



If you don't need the automatic test function, please set [Self-Test Times] to 0

(4) Result calculating

Calculate the average burst strength P , expressed in kilopascals (kPa).

The burst strength index X is expressed in kilopascal square meters per gram (kPa·m²/g).

$$X = \frac{P}{g}$$

herein:

X — Burst index, kPa·m²/g;

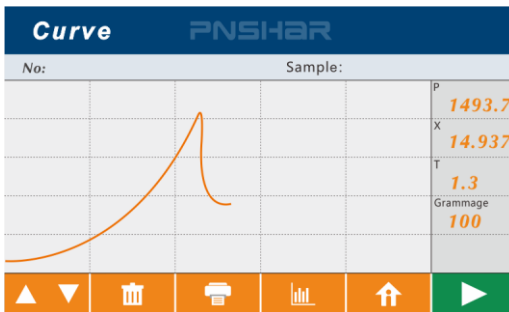
P — Average burst strength, kPa;

g — sample grammage, g/m².

8.6 Testing result processing

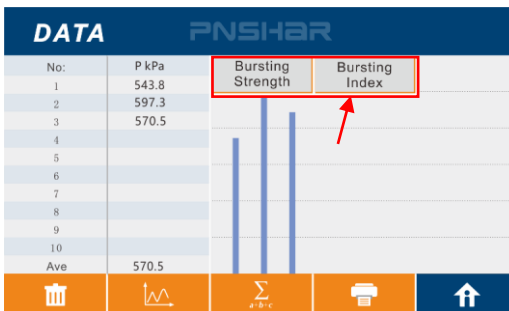
(1) Single test result curve display

In the test [curve] interface of [Data Center], you can query all test results by pressing the key  , and can also perform operations such as printing and deleting.



(2) Bar graph display

In the [Test Curve] interface, press the key  to display the test result in a bar graph.



Click [P kPa] to pop up the force value and stiffness options, select according to your needs.

(3) Data deletion

Select one or more data and press the key  to delete the selected data.

without selecting any data, press the key  to clear all the saved test data.

(4) Data statistics

In the [Data Center] interface, press the key  to display the statistical report of all test results this time, including the average, maximum, minimum, standard deviation and coefficient of variation.

Statistics PMSHAR			
Sample		Ave	
Test Num		Min	
Remark		Max	
Tester		SD	
		CV	
			

(5) Result printing

Single print:

Select one or more data, click the key  to print the selected data.

Statistics printing:

Click [Statistics] key first, then click the key  to print the statistics report.

Single print report style:

Test Report

=====

INSTRUMENT:PN-BSMF 【PNSHAR】
 Sample: PNSHAR123456789
 Grammage: 300 0 g/m²

 01: P = 645.4 kPa
 X = 2.151 kPa • m²/g

 D:2020-11-22 T: 16:32:54
 Remark:
 Tester:

Statistical print report style:

Test Report

=====

INSTRUMENT:PN-BSMF 【PNSHAR】
 Sample: PNSHAR123456789
 Grammage: 300.0 g/m²
 Total: 03

 01: P= 645.4 kPa
 02: P= 709.1 kPa
 03: P= 577.6 kPa

 Ave(P)= 644.0 kPa
 Ave(X)= 2.147 kPa • m²/g

 Min(P)= 577.6 kPa
 Max(P)= 709.1 kPa
 SD =65.8 kPa
 CV =10.2 %

 D:2020-11-22 T: 16:32:54
 Remark:
 Tester:

Test report description :

- ✧ 01, 02, 03 in multi test report: is the test serial number.
- ✧ Average burst strength-P: The average burst strength of multiple samples in the same batch.
- ✧ Average index-X: the average value of the burst index of multiple samples.
- ✧ Coefficient of Variation-SD: The ratio of the standard deviation to the average.
- ✧ Standard deviation-CV: describes the average of the difference (deviation from the mean) of each data from the mean..

Chapter 9 Tester Calibration and Maintenance

The calibration of the hydraulic system of the tester should be performed by professionals with metrological qualifications. The general calibration cycle is one year. After replacing the new film, the film resistance must be checked.

9.1 Hydraulic system calibration

➤ **Main calibration device:**

Standard pressure gauge

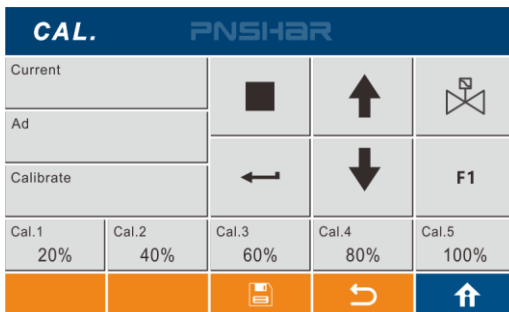
➤ **The calibration steps are as follows:**

(1) Remove the sealing screw at the calibration hole (19) and connect it to the standard pressure gauge through the high-pressure tubing.



(2) Adjust the air pressure by the pressure regulating valve. PN-BSM600F to be above 0.6MPa, and PN-BSM160F to be above 0.4MPa

(3) In [Test Center], click  →  →  to enter the instrument calibration interface.



(4) Put a metal flat plate between the upper and lower pressure plates, press



the solenoid valve to open, and the upper and lower pressure plates are pressed tightly.

(5) Press calibration point 5 and wait for the pressure to rise to the set value,

and press the key  to wait for the film reset to be completed (repeat 3 times).

(6) Press calibration point 4 and wait for the pressure to rise to the set value.

After the pressure displayed by the standard pressure gauge is stable, click [Standard Value] to input the pressure value on the standard pressure gauge, and press to enter the password "1253" to confirm.

(7) Press the  key and wait until the film reset is completed, other calibration points can be checked as needed.

(8) After the calibration is completed, press  the solenoid valve to close the upper pressure plate and reset. Adjust the air pressure back to the range of test, and the pressure calibration is completed.

If the required pressure is not at the calibration point, you can press the key



to control to the required pressure value for calibration.



The standard pressure gauge used by our company is a digital pressure gauge. If you are using a piston pressure gauge, please refer to the instructions of the piston pressure gauge for the pressurization method.

9.2 Changing rubber film

The rubber film is a consumable part. After a period of use, the rubber film may have low resistance or rupture, or the test results may have large deviations. At this time, the rubber film needs to be replaced.

➤ **Tool:**

Special wrench

➤ **Procedure:**

- (1) Remove the protective cover (20) outside the upper pressure plate ;
- (2) Put a piece of cardboard about (100×100mm) between the upper and lower platens ;
- (3) Adjust the pressure regulating valve to make the pressure reach above 0.6MPa ;
- (4) Enter the tester calibration interface, click the  upper platen and press down to clamp the cardboard

(5) Use the special wrench to loosen the compression coil (21) counterclockwise,

click  and the upper plate reset, and remove the compression coil, lower pressure plate and film

(6) Fill the cylinder with silicone oil until the oil level reaches the highest level.

Wipe clean both sides of the new film, and put the film flatly, make sure no air entering under the film.

(7) Cover the lower pressure plates, pay attention to the positioning hole on the lower plate and make the positioning pin on the cylinder to be aligned, install the compression coil and tighten it clockwise with the special wrench.



(8) Put a piece of cardboard about (100mm×100mm) between the upper and

lower platens. Click  the upper platen to press down to clamp the cardboard.

(9) Tighten the compression coil with the wrench.

(10) Click on the upper pressure plate to reset. Loosen the handle (16) on top of the oil cup, so that the oil in the oil cup get into the oil cylinder to make the film bulge upward.

(11) After the rubber film is installed, without placing the sample, set the value of [rubber film parameter] to "500", and then click [Test] key, observe the burst strength value displayed on the tester, and note down the current burst strength

value when the alarm of no sample, and enter the obtained value + 30 into the [film parameter].

9.3 Rubber film resistance checking

➤ Tools

Height gauge: 10mm/18mm (PN-BSM600F);

9mm (PN-BSM160F)。

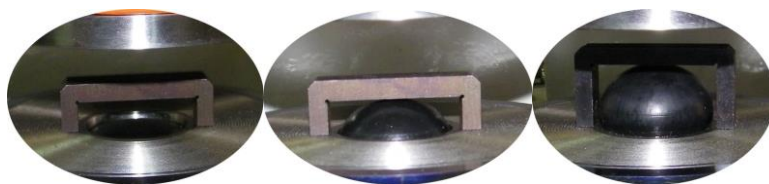
➤ Rubber resistance checking procedure:

Place the 10mm height gauge directly above the inner hole of the lower platen.

Click the button  to make the film bulge upward, and click the button

 when the peak of the rubber film just touches the height gauge. Record the burst strength value displayed on the display of the tester. Change to a height gauge of 18mm and record the burst strength value when the film bulge is

18mm high. After finishing, click the button  and wait until the film reset is completed.



If the measured burst strength value exceeds the following standard value of the film resistance, it is recommended to replace the film.

➤ Standard value of film resistance

Standard film resistance is as follows

Table2

Mode	Bulge height (mm)	Resistance (kPa)
PN-BSM160F	9.0±0.2	30±5
PN-BSM600F	10.0±0.2	170 ~ 220
	18.0±0.2	250 ~ 350

9.4 Coaxiality check

➤ **Checking procedures are as follows:**

(1) Adjust the pressure regulating valve to make the pressure gauge indicate

0.2MPa.

(2) Enter the tester [Tester Calibration] interface

(3) Place the convex side of the coaxial metric upwards in the middle of the lower platen, so that the convex bulge of the coaxial metric just fits into the hole

of the lower platen, and click  the upper platen to clamp. If the bulge of the coaxial metric just enters the hole of the upper platen indicates that the tester has normal coaxiality. Otherwise, please contact our company.

(4) Click  to reset the upper platen, take out the coaxial metric, and the calibration completed.

9.5 Silicone oil replacement

After the tester is used for a period of time, the silicone oil will be

contaminated or lost, and then it needs to be replaced at this time. The silicone oil model is dimethyl silicone oil (201-50LS).

➤ **Changing procedures:**

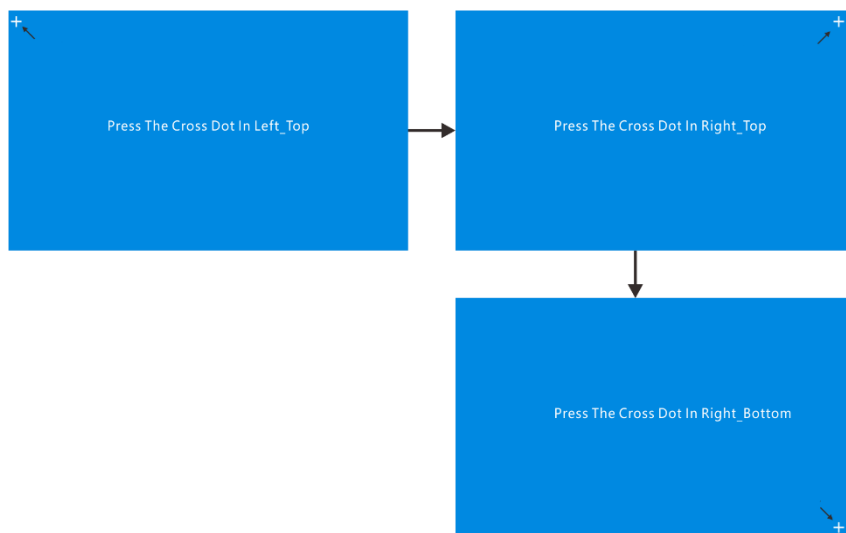
- (1) Remove the film according to the method of replacing the film.
- (2) Use an oil absorber to suck up the dirty oil in the oil cylinder.
- (3) Use an oil absorber to suck clean silicone oil into the cylinder, fill it up and make the surface of the silicone oil slightly higher than the cylinder, and fill the oil cup with silicone oil at the same time. The newly added silicone oil should be left for 24 hours.
- (4) Reinstall the film according to the method of replacing the film, and check the resistance of the film.

9.6 Maintenance of transmission parts

In order to prolong the service life of the tester and reduce the abrasion of mechanical parts, lubricate the hydraulic piston rod (6) and screw (5) regularly.

9.7 Screen calibration

If the touch screen button does not work well, or the position is offset, you can perform touch screen calibration. Tap the middle curve display area of the [Test Center] interface more than 10 times in quick succession, stop tapping after hearing the buzzer, and enter the touch screen calibration mode, follow the prompts to tap the position of the cross line, after calibration, return Test center interface.



Chapter 10 Intelligent Information Network Connection

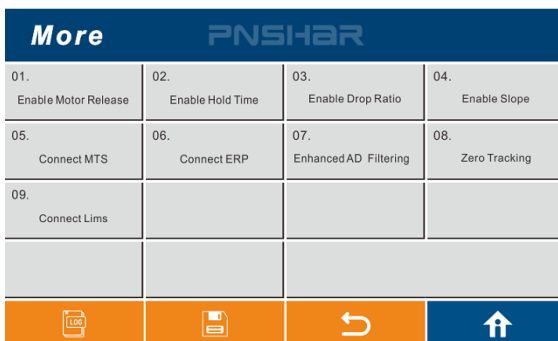
The tester has a variety of connection forms, which can be connected to a computer via USB, serial port, WIFI network, and transmit test data to a designated local or cloud server.

10.1 Wireless network connection

Refer to the description in Chapter 7 for the wireless connection method. After networking, turn on the [Data Storage] function, and the test results can be transmitted to the server in real time via the WIFI network for use by the management system.

10.2 Other forms of connection

In [Test Center], press  →  →  →  to enter the [More Settings] interface.



 Indicates that it is selected, press , and enter the password "1263" to save the settings.

✧ 05 Connect MTS:

Connect PNSHAR professional test software.

✧ 06 Connect to ERP:

Connect PNSHAR PN-QMS series quality management system software.

✧ **9 Connect to Lims:**

Connect to the customer's LIMS or ERP management system (connection agreement can be customized).

Chapter 11 Trouble shooting

Fault 1: Air leakage in the pressure regulating valve

Problem Reason:

Air source supply pressure not enough

Solution:

Close the air source valve first to ensure that the gas source pressure is above 0.6MPa before supplying air to the tester.

Fault 2: The test result is always zero

Problem reason:

- 1) Loss of force coefficient.
- 2) Load cell broken

Solution:

- 1) Restore the parameters or contact our company to manually correct the force value coefficient.
- 2) Replace the load cell.

Fault 3: "ERROR in no sample"

Problem reason:

- 1) Silicone oil in the cylinder is not enough.
- 2) Rubber film sinks.
- 3) Air enters the hydraulic system

Solution:

Loosen the handle (16) on top of oil cup to add silicone oil to the cylinder.

- 2) In the [Tester Calibration] interface, click  the film to bulge about 5mm from the lower plate, and click  immediately. After 2 seconds, release the handle, and then click  to reset the film, and tighten the handle. Pause for 10 seconds and repeat 5 times to make the film bulge close to the lower platen.
- 3) Re-install the rubber film

Fault 4: Tester vibration or excessive noise**Problem reason:**

- 1) Motor fault.
- 2) Piston fault.

Solution:

- 1) Check and repair the motor
- 2) Lubricate the piston, or adjust the piston.

Fault 5: Inaccurate position of touch screen buttons**Problem reason:**

Touch screen deviation.

Solution:

Follow the screen calibration method to calibrate the touch screen.

Chapter 12 Packing List

Item	Name	Unit	Qty	Note
1	Paperboard/paper burst tester	set	1	PN-BSM600 F/160F
2	Power cable	PCS	1	
3	Printing paper	roll	3	
4	Product certification	PCS	1	
5	User manual	PCS	1	
6	warranty card	PCS	1	
7	Packing list	PCS	1	
8	Special wrench	PCS	1	
9	Coaxiality gauge	PCS	1	
10	Height gauge	PCS	2	PN-BSM160 F 1PCS
11	Rubber film	PCS	1	
12	Trachea	PCS	1	
13	Silicon oil	PCS	1	

HANGZHOU PNSHAR TECHNOLOGY CO.,LTD.

Add.: 2-6F, No.948, DongXin Road, Hangzhou ,Zhejiang, China

P.C.: 310022

Tel.: +86-571-88351253/88351053

Fax.: +86-571-88351263

E-mail: pnshar@pnshar.com

<http://www.pnshar.com>