

CONTINUATION

Dear User,

We're indebted for your patronage to purchase SH series digital push pull force gauge. Before using the instrument, please carefully read the manual to use it rightly. Please keep the manual and the warranty well to give you help when you can't learn it or there is something wrong with it. Data of the manual is equally had newest product as evidence, because of improvement or other change, description of manual may differ from practical situation. Our company will reserve the right corrected at any moment, it is difficult to list the corrected place one by one.

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SH SERIES USER'S MANUAL

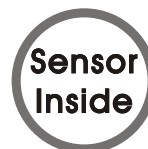
SH系列

使用说明书

MC 浙制 03020220 号

数 显 式 推 拉 力 计

DIGITAL PUSH PULL FORCE GAUGE



传感器内置


温州山度仪器有限公司  
WENZHOU SUNDOO INSTRUMENT CO., LTD.

- C. Insert the accessory CD into computer and open the following path: CD-ROM drive/Chinese/SH and ST port software/SundooPort/SundooPort.exe; This software need not be installed, and you only have to copy the SundooPort folder to computer hard disc and then double click it.
- D. Single click the tool on menu column - parameter optional dialogue column, then set the parameter (picture) Choose the port: COM1 or COM2 which correspond to the port line.
- E. Data can be received by pressing "print" on the gauge. Refer to Picture2.
- F. Preserve the tested data and the format is excel electronic form and TXT plain text form. For excel electronic form, please refer to picture3.

**Appearance and installing size**

Please refer to Page 3.

**Battery charging**

This gauge uses Ni-Hi batteries with 8.4V/1200mAh. The fully charged battery can work for about 20 hours. If the battery power is low, "  " will appear on the screen. Please charge the battery with adapter 12V, DC/300mA for four hours.

Cautions:

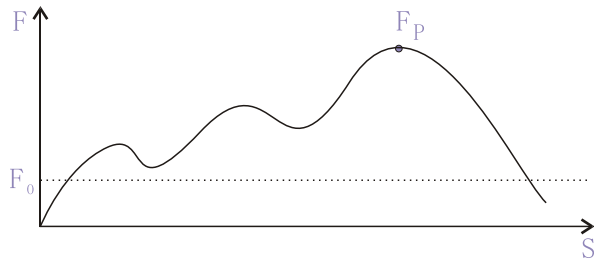
1. Frequent and long time charging will shorten the life of battery
2. Please charge the battery after exhaustion of power to cancel the remember effect of battery
3. Test can be conducted while the battery is charging
4. The life of battery: 500 times of charging and discharging with normal operation.

**SH系列规格参数 (SH Series Technical Specifications)**

型号 Model	SH-2	SH-5	SH-10	SH-20	SH-50	SH-100	SH-200	SH-500
最大负荷 Capacity	2N	5N	10N	20N	50N	100N	200N	500N
负荷分度值 Minload	0.001N	0.001N	0.005N	0.01N	0.01N	0.05N	0.1N	0.1N
示值误差 Value error	±0.5%							
单位 Unit	N, kgf, lbf							
电源 Power	Ni-Hi 8.4V 1200mAh							
传感器结构 Sensor conformation	传感器内置 Sensor inside							
工作温度 Work temperature	20±10°C							
运输温度 Carry temperature	-27°C ~ +70°C							
相对湿度 Relative humidity	15% ~ 80% RH							
工作环境 Work environment	周围无震源及腐蚀性介质 No vibrancy and no cauterly							

**Memory, peak and min captured value**

When you are using the memory function, please set the min captured value "F0" first. In the test, the gauge will remember the peak value which is above "F0". When the value is less than "F0", one time of test is completed.

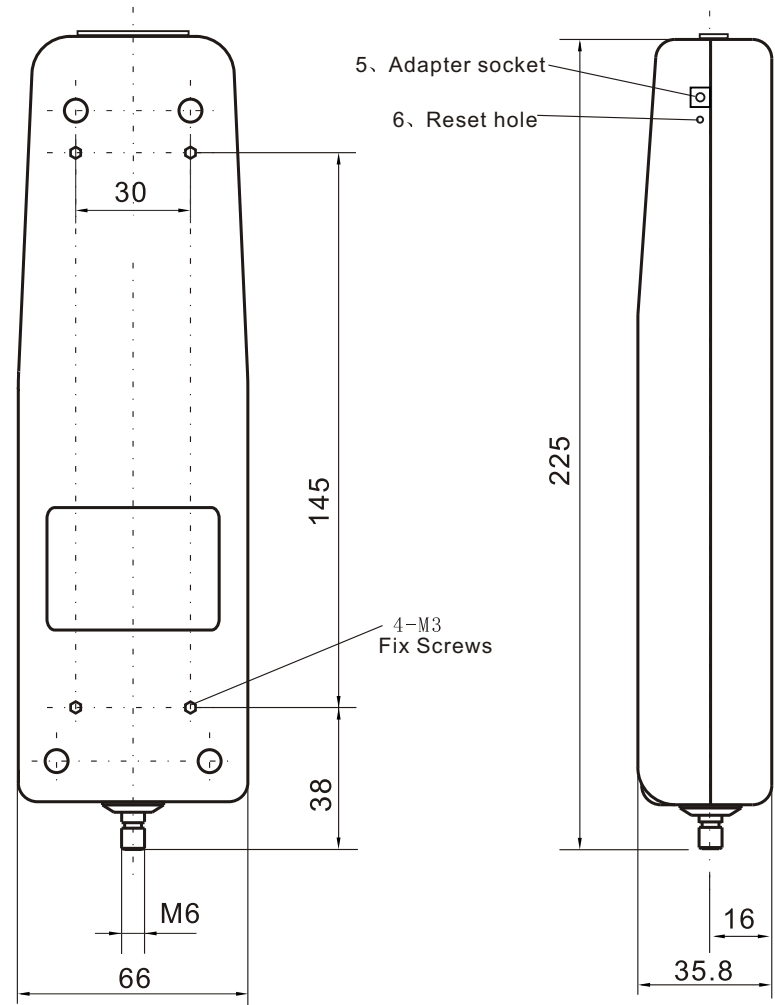


The peak value "Fp" will be kept and "✓" will show in the left memory position on the screen with "▲" rising one case. When the min captured value is higher than the tested force, the memory function will not take effect. This gauge can memorize 10 value and the first value will be deleted when it is the 11<sup>th</sup> time to test. You can choose the position for memorizing by pressing "□□" and the tested value kept in that position will be showed on the small digital frame. If you want to check average of all reserved data, please press "memory" and the screen will show "AVERAGE". The digital frame will also display the average for all the memorized data. Pressing "memory" will set the memory condition.

**RS-232C output**

This instrument's output is RS-232C and the mated outside equipment must comply with RS-232C. To get to know the setting method of RS-232C data output way, please refer to the E in P13.

**SH系列外形尺寸 (SH Series Dimension Unit/mm)**



## Testing

### 1. Turning on the power

When the power is off, connect the power and press "OFF/ON" button to make the power on. Then the screen will show "SUNDOO" and the model of this gauge, and that means the gauge is in normal condition. When the measuring tip loads the object with not over 5% of the load capacity, the gauge has the automatic cleaning zero function; on the contrary, when the object is over 5% of the load capacity, error may happen so please use light tips. When the power is on, pressing "OFF/ON" button makes the power off. The gauge will turn off itself after the set time when it is not in operation.

### 2. Zero cleaning

After the gauge is turned on, pressing "ZERO" cleans the zero after the reading the stable. The range of zero cleaning is  $\pm 5\%$  of the capacity. Pressing "ZERO" cleans the peak while it is in peak-holding mode and saves the set value in setting mode.

### 3. Test mode choosing

The force gauge provides three kinds of test modes: track mode, peak holding mode and auto-releasing of peak. The track mode is default when the gauge is turned on and there is no "PEAK" on the screen. After pressing "PEAK", the screen will show "Peak" and it is in peak-holding mode and the value showed on the gauge is the max value the shaft can bear. Pressing "ZERO" cleans the value. Pressing "PEAK" again makes the screen show "AUTO PEAK" and the the auto-releasing of peak will be delayed. The reading is the max value the sensor can stand. The reading will be cleaned after 1-10 seconds. The three mode can exchange when the "Peak" is pressed every time.

### 4. Selection of unit

Pressing "UNIT" converts the units: N, kgf and lbf.

### 5. Setting upper and lower limits, min captured peak value, auto power off time and RS-232C output connection.

a. Pressing "set" button the first time makes the screen display "HIDT" and the upper limit is showed in the digital frme.

Pressing "set" button the second time makes the screen display "lodt" and the lower limit is showed in the digital frme. Pressing "□□" changes the value.

## CONTENT

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On/off button



Zero button  
Clean zero, peak value or save the setting



Unit  
Three units are optional and convert automatically



Peak  
Switch of peak mode, peak holding, semi-peak holding and track.  
Track mode is default when the gauge is on.



Print  
A. When RS-232C is set at "print" , pressing this button prints the ten data and analysis report.  
B. When RS-232C is set at "PC" , pressing this button transmits the ten data to computer.



Memory  
Memorize the tested value and calculate the average of memorized data.



Setting  
A. Pressing " set " button the first time, "HIDT" will appear on the LCD and the upper limit is set. Pressing "□□" changes the value. Pressing "set" button the second time, " LODT " shows on the LCD and the lower limit is set.  
B. Pressing " SET " button the third time, "LE.SET" shows on the LCD and the data showed is the min memorized value. Pressing "□□" changes the (In the test, the data which is less than the min memorized vaue will not be memorized.)  
C. Pressing "set" the forth time, the "P.OFF" will show on the LCD and the time of auto clean peak appear on the value display.  
D. Pressing " set " the fifth time, the "A.PE" will display on the LCD and the time of auto clean peak appear Pressing " set " the fifth, on the value display.  
E. Pressing " set " the sixth time, the screen will show "rs232" and data frame will show "pc" or "print" . Pressing "□□" changes the mode, "PC" means outputting the data to computer with RS-232C output; "Print" means transferring the data to printer. Pressing " set " button the seventh tmie saves the setting.

7. Do not use damaged or warped tips or hooks .
8. Do not use this gauge near water, oil or other liquids. Please store it in a dry and clean place.
9. Use adapted charger, or the electric break-down may happen even fire .
10. Use after inserting the AC charger into the socket .Any loose fitting may cause electric shock or fire.
11. Do not use the voltage exceeding the capacity , otherwise the electric shock or fire may happen.
12. Do not plug the adaptor with wet hand.

### Function

SH series digital push pull force gauge ,with compact size and high accuracy, is easy to operate and handy to carry. It can be used not only for measuring tension/compression force but also for various testing purposes such as switch test , insertion/withdrawing test and fracture test. Furthermore, it can also be matched with test stands and clamps for multipurpose measurement.

### characteristic

- ※High accuracy and high resolution;
- ※Peak holding and auto-releasing.
- ※Upper and lower limit setting.
- ※Force direction indication
- ※Blue background illumination
- ※ Memorizing and calculating the average
- ※ LCD screen direction turning

- ※ Automatic power off
- ※ Units conversion
- ※ RS-232C output port

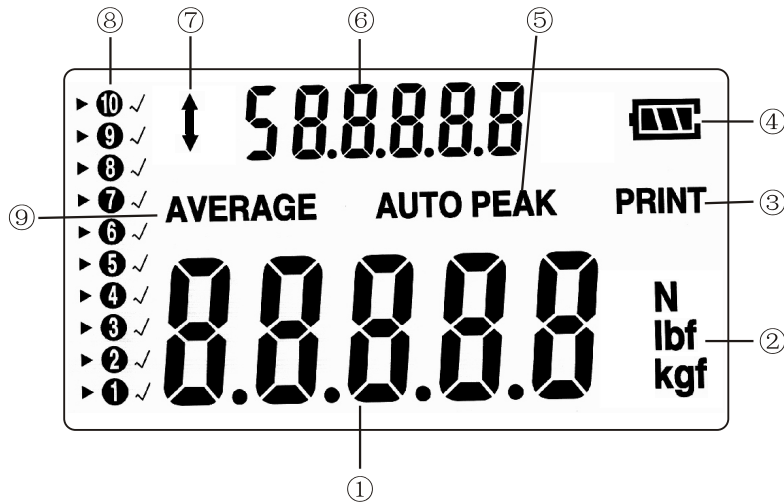
### Specification

Please refer to P1.

### Description of parts and function

Please refer to P2 for parts' description.

#### 1. The LCD display window



The meaning of symbols:

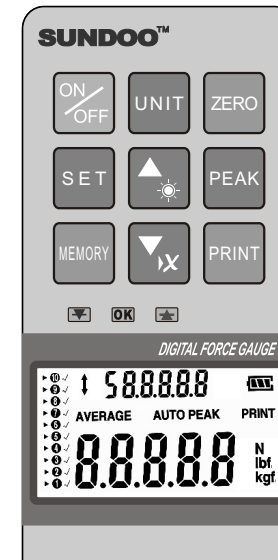
- ① Displaying the measured value; in setting mode, it is the set value.
- ② Units of push pull force. Three units " N " , " lbf " , " kgf " are optional.
- ③ Printing all the reserved data.
- ④ Indication of power content.

- ⑤ "PEAK" means it is in the state of peak holding;  
"AUTO PEAK", means it is in the state of auto-releasing.
- ⑥ Auto calculating the average and the indication symbol in setting mode.
- ⑦ Symbol of force direction  
"↑" means tensile test and "↓" means compressive test.
- ⑧ Memorizing the test value.

The force gauge can memorize 10 tested value . There are 10 grids on the LCD and each of them memorizes one tested value ."▶"Means the showing value and "✓" means the tested value has been saved .

- ⑨ Symbol of average

#### 2. The function of bottoms.



**Safety Precaution**

**CAUTION**

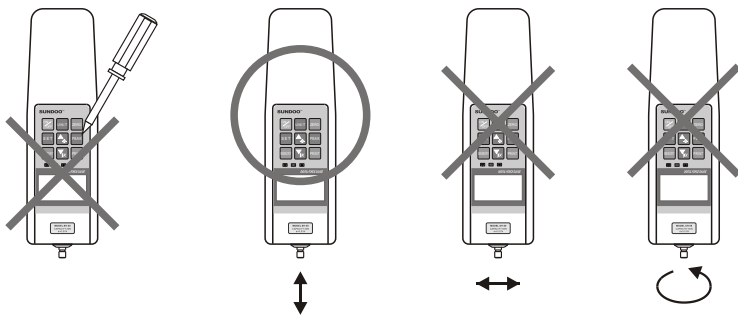
Wrong operation may damage the device or leads to serious result.

There are important precautions and operation methods listed in our manual, so please read it before using the instrument. If shock load is tested, please choose the test stand with double load.

**WARNING**

1. In break down or shear test, wear protective mask to protect you from scattering pieces.

- 2: Do not use the damaged or warped clamps. Or this kind of clamps may be off or broken, leading the tested object fall on your foot.
- 3. When Error appears on the screen, the load has exceeded 110% of the capacity.
- 4. Do not use damaged or warped tools to press the button .



- 5. Do not load bending or twisting force on sensor.
- 6. Do not apply excessive load. Or the device will be damaged.



- Add 1 ( the display direction changed is reduce 1)/background light switch
  - A. In memory mode, press it one time, symbol will forward one case.
  - B. In setting mode, press it one time, the value will increase one.
  - C. In the average mode, It is the switch of the background illumination.



- Reduce 1 ( the display direction changed is add 1)/delete
  - A. In memory mode, press it one time, symbol will backward one case.
  - B. In setting mode, press it one time, the value will decrease one.
  - C. In the average mode, press it one time, all of memory data will be deleted.

3. The Pilot lamp of upper and lower limit.

- Pilot lamp of upper limited alarm
- Pilot lamp of normal
- Pilot lamp of lower limited alarm

4、 Communicating port

RS-232C series port output the value data to PC or printer.

5、 Power connector

Suitable power adaptor with 12v DC ,300MA .

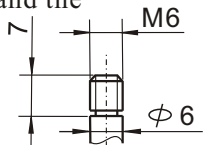
6、 reset hole

It is to restart the gange, when the gauge is strongly disturbed

**Preparation before operation**

1. Check the power supply

When the power is on, check the battery. If the Ni-Hi batteries power is low, "⚡" appears on the screen. Please charge battery by connecting AC adapter. Charge the battery as follows: Connect the AC adapter with the gauge first and then connect the adapter to 220V/50HZ power supply. Right after the charging started, "■" is displayed. Charging time: 4 hours. Measurement during charging is possible and the battery can be charged when the power is on or off.



2. Installing measuring tips

Please choose the best tip and fix it on the measuring shaft. Do not screw the measuring tip too forcibly, or the sensor would be damaged.

测试机台（可选件，图片供参考）

Test Stands, No Included, Picture Only For Reference.



SLJ型



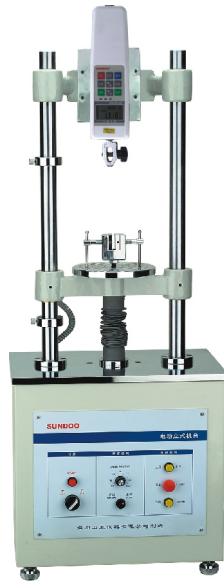
SPJ型



SPH型



SJH-500型

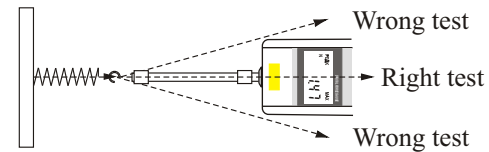


SJV-5K型

- b. Pressing " set " the third time makes the screen show " LE.SET " and the min captured peak value is displayed in the digital frame. Pressing " " changes this value. Data which is less than this value will not be memorized.
- c. Pressing " set " the fourth time makes the screen show " P.OFF " and the digital frame will show the time of auto power off. Pressing " " changes the value.
- d. Pressing " set " the fifth time makes the screen show " A.PE " and the digital frame will show the peak auto-releasing time. Pressing " " changes the value.
- e. Pressing " set " the sixth time makes the screen show " rs232 " and " PC " or " Print " will be showed in the digital frame. Pressing " " changes the value. " PC " means outputting the data to computer with RS-232C output; " Print " means transferring the data to printer to Printing the 10 memorized data.

**B. Testing**

Please hold the gauge or fix it on a suitable test stand. Keep the gauge and the measured object in a line, otherwise the value will not be correct.



**C. After testing**

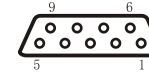
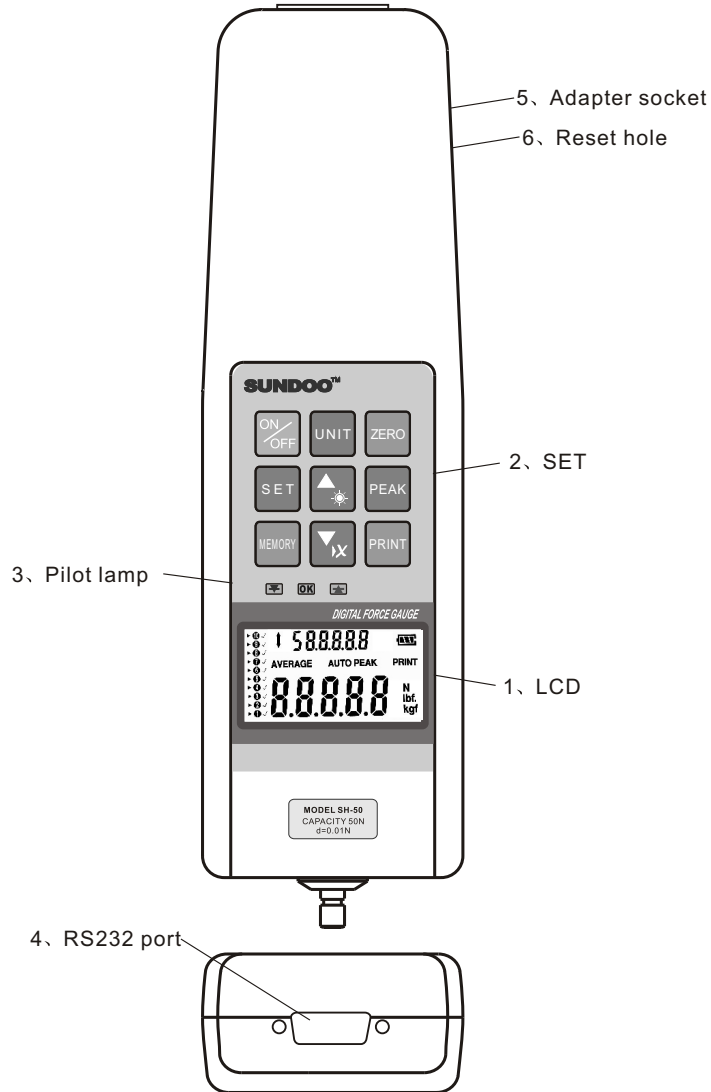
After the test is finished, turn off the power and take off the measuring tip, then clean and put all the parts and accessories of the gauge into the case.

**Test stands its appurtenance**

This gauge can be fixed with various test stands for multi-purpose, testing insertion/withdrawing force, push pull force and fracture test.

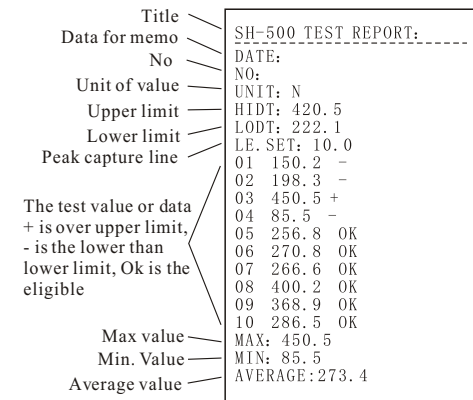


SH系列推拉力计结构名称 (SH Series Parts Apellation)



Needle	Signal	Illustration
2	TxD	output signal of SCM
3	RxD	incept signal of SCM
5	GND	Earth
6	+3.3V	over upper limit
7	+3.3V	Ok is the eligible
8	+3.3V	lower than lower limit

1. When RS-232C output is set at "Print", the screen will flicker when "print" is pressed and ten groups of data and analysis report will be printed. Please refer to the picture on right.



2. When RS-232C output is set at PC, the screen will flicker and when "print" is pressed, ten groups of data will be transmitted to computer. Specific method of connecting apparatus and computer is in the Following:
- Connect the push pull force gauge to PC with RS-232 cable;
  - Turn on the gauge and make it on the working state, then set RS-232C to the state of output to PC. Please refer to the in P13.

### Package list

Item	Parts name	Quantity
1	Main body	1
2	AC adapter	1
3	Measuring tips	5
4	Extensive shaft	1
5	M3X8 screws	5
6	CD-ROM	1
7	Manual	1
8	Inspection Certificate	1
9	Qualification Certificate	1

### Maintenance

Thank you very much for your patronage to purchase SH series digital Push pull gauge.

The digital force gauge is compact size and high accuracy. They are easy to operate and handy to carry out. The force gauge can display the direction of the force. The force gauge has the blue background light lamp. The gauge has the pilot lamp and buzz alarm to show the upper and lower limit. The gauge can memory 10 test value and calculate the average of the memorized test value automatic. The data display can be changed the direction. Having set the normal measuring\peak hold\automatic peak switch can be used for peak hold test and normal measuring. Non-operation automatic power off, the power off time can be set from 1-60 minutes. Output of series port (RS-232C), transmit the information to PC. Before using the instrument, please carefully read the manual to make gauge have a accurate tested value.

1. Clean the gauge with soft cloth. First put the dry cloth in the water with detergent and then dry the cloth and clean the gauge. Do not use volatile chemical liquid such volatile oil, thinner, alcohol, etc.
2. Handle carefully while carrying and using the gauge.
3. Do not disassemble, repair or modify the gauge yourself. Any of the above behaviours may cause the malfunction of the instrument.
4. If there is something wrong with the gauge, please contact the original sales department or our company.