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OPERATION MANUAL

Model ISF-S50, ISF-S100, ISF-S200, ISF-S500
Digital Spring Tester

INSIZE

Thanks For Your Purchase Of The Spring Tester

Dear User

We are indebted to you for your patronage of purchasing our ISF-S Series of Spring Tester. Before using the instrument, please read the manual carefully and keep it well in case some problems happen. The data of this manual is based on the latest products and there may be some difference between the description on the manual and real situation because of some improvement or other change. Our company reserve the right to modify the manual at any moment and it is difficult for us to notify you one by one. We really appreciate your great understanding. The copyright of this manual belongs to Insize Co.,Ltd. Any unit or individual has no right to copy or plagiarize part or whole contents of the manual, without the consent of our company.

This spring tester has the following characteristics: high accuracy and high resolution; test direction displaying; blue background lamp; upper and lower limits setting; automatic data calculation; three units (N, kgf, ibf) conversion; peak holding, peak auto-releasing and its time setting; auto power off and free time setting; printer inside; ten groups data memorizing; max and min value, average, qualified and unqualified value judging and so on. Before using the instrument, please read the manual carefully so that an accurate value can be got in the test.

Content

⚠ CAUTOIN

The device may be damaged if it is improperly operated. 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 and gloves 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. This instrument tests the tensile and compressive force of elastic objects after being compressed. So please do not release force in the direction which makes the sensor and test stand curve or deformed.
4. Do not apply excessive load than rated. In case that the sensor may be damaged because of improper operation, a stopping device is inside the instrument but useless for overload capacity and others.
5. When Error appears on the screen, the load has exceeded 110% of the capacity, at this time please lower the load. Do not overload 5% more of the capacity at the beginning of testing.

Safety precautions and maintenance

1. Do not apply excessive load. Or the device will be damaged.
2. Do not hit the digital screen or put anything on it.
3. Do not use nails or pointed tools to press the button.
4. Do not operate near water, oil or other liquids. Please store the instrument in a dry, cool and stable place.
5. Do not plug the adaptor with wet hand. Or electrical shock may happen.
6. 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 as volatile oil, thinner, alcohol, etc.
7. Handle carefully while carrying and using the gauge.
8. Do not disassemble, repair or modify the gauge yourself. Any of the above behaviours may cause the malfunction of the instrument.
9. If there is something wrong with the gauge, please contact the original sales department or our company.

Functions

ISF-S series digital spring tester is especially used to measure the load and deform extent of tensile and compressive spring. It is suitable for the load test of tensile and compressive spring under a certain working length. It can also be applied in spring load test for elastic components such as rubber and reed, and insertion and withdrawing, fracture tests for connecting components.

Characteristics

1. High accuracy and resolution;
2. Upper and lower limit setting, red, green lamp and alarm indication of result;
3. LCD screen direction turning;
4. Blue background illumination;
5. Memorizing 10 tested data and auto calculating the average;
6. Three units (N, kgf, lbf) conversion;
7. Peak holding and auto-releasing and its time setting freely;
8. Automatic power off and its time setting freely;
9. Inside printer, printing 10 groups of tested data, max and min value, average, qualified and unqualified value.

Descriptions of parts and functions

Dimension:
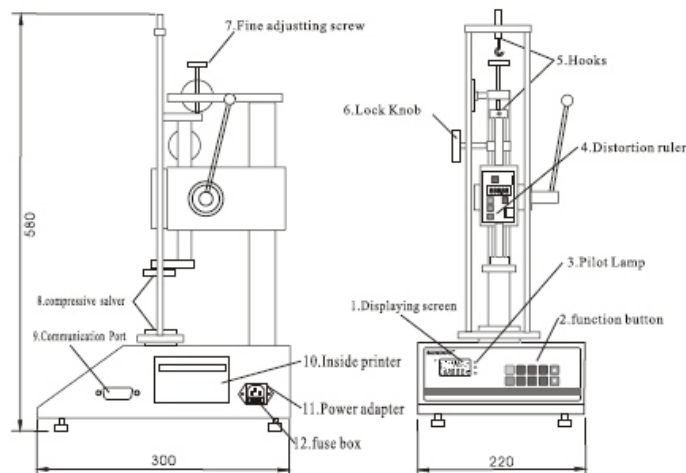
1. The LCD screen window
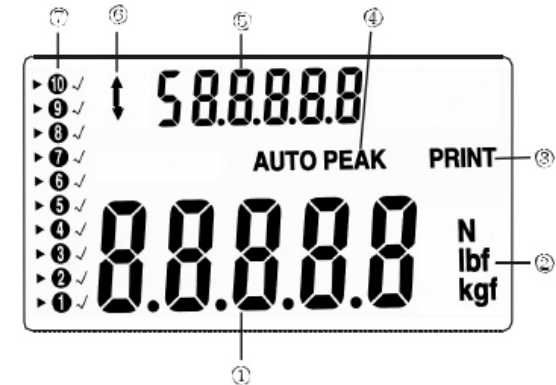
The meaning of symbols:

① Displaying the measured value; in setting mode, it is the set value.
② Units of tester. Three units "N", "lbf", "kgf" are optional.
③ Printing all the reserved data.
④ 'PEAK' means it is in the state of peak holding; "AUTO PEAK" means it is in the state of auto-releasing.
⑤ Auto calculating the average of memorized data, and the symbol function of setting mode.
⑥ Symbol of force direction. " ↑ " means tensile test and " ↓ " means compressive test.
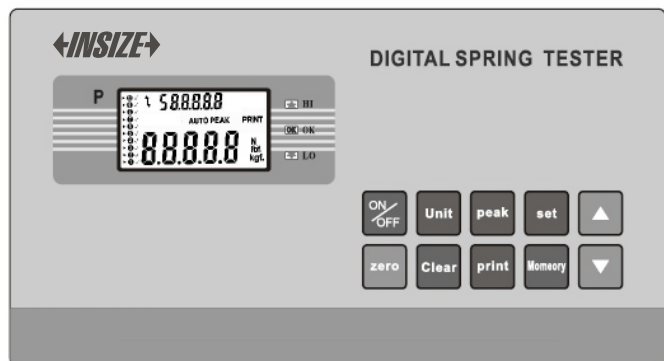⑦ Memory test value.

❶❷❸❹❺❻❼❽❾❿ The force gauge can be memory 10 unit test value.

There are 10 grid on the LCD; and every grid memory one test value.

" ▶ " means the value is showed now.

" √ " means the tested value has been saved.

2. The function of buttons.

ON/OFF	Switch on/off button
ZERO	Zero button Clean zero, peak value or save the setting
UNIT	Unit Three units (N, kgf, Ibo are optional and convert automatically)
CLEAR	Clear Pressing this button once clears the data "1" points at, all the reserved data can be cleared by pressing the button continuously.
PEAK	Peak Switch of peak mode, peak holding, semi-peak holding and track. Track mode is default when the gauge is on.
PRINT	Print Pressing this button prints out all the reserved data, the spring working length, upper and lower limits, min captured value and the max and min average in the reserved data. (View printer sample of page 13)

Memory

Only when" peak "state is not set and the tested value is not "0", tested value can be kept by pressing this button.

Setting

A. Upper and lower limits alarm setting;
B. Captured line of reserved value setting;
C. Automatic power off time setting(1-60 minutes free setting but 0 will not be cleared automatically);
D. Auto peak clear time setting(1-10 seconds free setting)

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. Pressing "SET" button the third time, "LE.SET" shows on the LCD and the data showed is the min memorized value. Pressing " ▲ ▼ " changes the value. (In the test, the data which is less than the min memorized value will not be memorized). Pressing "set" the forth time. The "P.OFF" will show on the LCD and the time of auto clean peak appears on the value display. Pressing "set" the fifth time, the "A.PE" will display on the LCD and the time of auto clean peak appears on the value display. Pressing set the sixth time, all the changed setting will be kept and be back to the testing state. In the setting process, pressing "zero" keeps the sets and makes the state back to the test state.

Add 1 button

A. while the instrument is operating, pressing the button one time makes the symbol forward one case. If there is ' √ " near the case, it means the case has reserved the tested value. So if the test continues, the former value will be replaced by the new one
B. In set mode, pressing " ▲ " button one time increase one case. The data will be increase continuously by pressing the button not release.

Reduce 1 button

A. while the instrument is operating, pressing the button one time makes the symbol backward one case. If there is " √ " near the case, it means the case has reserved the tested value. So if the test continues. The former value will be replaced by the new one.

B. In set mode, pressing " ▼ " button one time decrease one case. The data will be decreased continuously by pressing the button not release.

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. Distortion ruler
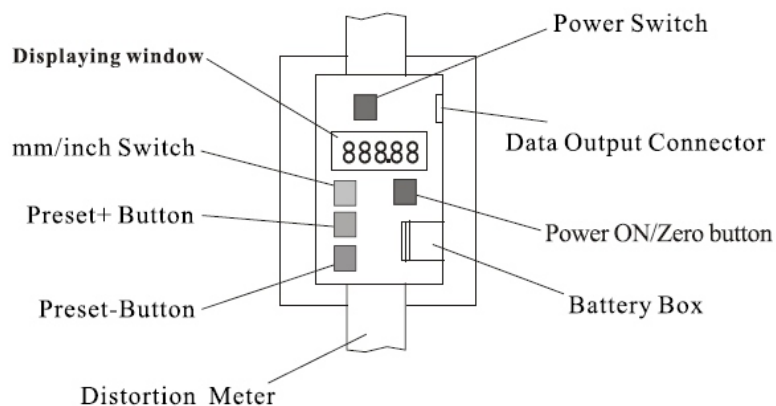
5. **Hook**

6. **Lock knob**

7. **Fine adjusting screw**

8. **Compressive salve**

9. **Communicating port**
   R-232C port output, connecting the outer apparatus.

10. **Inside printer can print the test data, such as max value, min value average value, eligible and unqualified.**

11. **Power socket**

12. **Fuse box**
    Inside is the blowing equipment against electricity overload.

Specification

MODEL	ISF- S50	ISF- S100	ISF- S200	ISF- S500
MAX WORKTNG LOAD	50N	100N	200N	500N
LOAD RESOLUTION	0.01N	0.02N 0	0.05 N	0.1N
THE MAX FREE TESTABLE LENGTH	95mm			
THE MAX TRAVEL	95mm			
DISTORTION VALUE eH	0.01mm			
DISTORTION INYRTFACE	LCD			
MIN LOAD INTERFACE	Blue Liquid crystal apheliotropic display			
PLATEN DIA	49mm			
ACCURACY	±1%			
ELECTRIC POWER	One 1.5V silver oxide battery (The battery can last about 1 year. If the battery is exhausted, the display will flash to indicate to change the battery.)			
POWER	20W			
WORKING TEMPERATURE	20 ±10℃			
RELATIVE TEMPERATURE	15% ~ 18% Rh			
DEPOSIT TEMPERATURE	-27℃ ~ +70℃			

Operation

A. Starting testing

1. Turning on the power

   When the power is off, connect the power and press " $\boxed{\%}$ " button to make the power on. 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 " $\boxed{\%}$ " 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 " $\boxed{zero}$ ",cleans the zero after the reading is stable. The range of zero cleaning is ±5% of the capacity. Pressing " $\boxed{print}$ " cleans the peals while it is in peak-holding mode and saves the set value in setting mode.

3. Test mode choosing

   The instrument 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 " $\boxed{print}$ ", 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 " $\boxed{peak}$ " cleans the value. Pressing " $\boxed{print}$ " again makes the screen show "AUTO PEAK" and 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 to10 seconds. The three modes can exchange when the PEAK button is pressed every time.

4. Setting upper and lower limits, min captured peak value, auto power off time and peak auto-releasing time. For more convenient to use the tester, this tester offers the set function of upper and lower limits, when the measured value keep within the range of upper and lower limits which was set, " $\boxed{Ok}$ " will be twinkle on the screen, it means eligible; if the measured value is higher than upper value, " $\boxed{★}$ " will be twinkle, the lamp alarm, it means ineligible, to warn the user this testing result is beyond the range. The upper/lower limits value may achieve with " $\boxed{memory}$ " and " $\boxed{▲}\boxed{▼}$ ". This tester also can set min captured peak value, auto power off time and peak auto-release time. The method is as following:

   a. Pressing "set" button the first time makes the screen display "HIDT" and the upper limit is showed in the digital frame. Pressing " $\boxed{▲}\boxed{▼}$ " changes the value "set" button the second time makes the screen display "LODT" and the lower limit is showed in the digital frame. Pressing " $\boxed{▲}\boxed{▼}$ " changes the value.

   b. Pressing "set" button the third time makes the screen show "LE.SET" and the min captured peak value is displayed in the digital frame. Pressing " $\boxed{▲}\boxed{▼}$ " changes this value. Data which is less than this value will not be memorized.

   c. Pressing "set" button the forth time makes the screen show "P.OFF" and the digital frame will show the time of auto power off. Pressing " $\boxed{memory}$ " changes the value.

   d. Pressing "set" button the fifth time makes the screen show "A.PE" and the digital frame will show the peak auto-releasing time. Pressing " $\boxed{▲}\boxed{▼}$ " changes the value.

   e. Pressing "set" button the sixth time keeps the changed sets. In set process, pressing "zero" keeps the sets and be back to the test state.

B. Testing

Tensile spring distortion extent and load testing:

A. Turning the tester on and it will check automatically.
B. Pressing "zero".
C. Drive the handle upward, connect the upper and lower hooks, and adjust the handle. When the displayed load approaches the capacity of spring, press the zero button on the distortion meter.
D. Please hitch the tested spring and turn the handle to the measuring distortion, then read the displayed value, the working load value of the spring.

Compressive spring distortion extent and load testing:
a. Turning the tester on and it will check automatically.
b. Pressing "zero" .
c. Drive the handle downward, connect the upper and lower hooks, and adjust the handle. When the displayed load approaches the capacity of spring, press the zero button on the distortion meter.
d. Place the tested spring and turn the handle to the measuring distortion, then read the displayed value, the working load value of the spring.

C. After testing

After the test is finished, put the load off and then turn off the power. If for long-time keeping, please plug out the socket and cover the tester with dust-proof cloth.

Remark1: The tester load measuring sensor adopts resistance transducer, so bending may happen wider the load. For reducing the error, the load on the transducer should be close to that on the tested spring so that the error caused by the bended transducer may be avoided. In the general precision measuring, the load value should be 10%-20% of the capacity while the distortion is set at zero.

Remark2: when the distortion is set at zero, the handle is at the lowest position, opposite to the spring testing. So the displayed values negative but the positive value should be adopted.

Appendix: the distortion form of load sensor:

The Distortion Form(N)	ISF-S50	0~1	1~5	5~10	10~20	20~30	30~50
	ISF-S100	0~2	2~10	10~20	20~40	40~60	60~100
	ISF-S200	0~4	4~20	20~40	40~80	80~120	120~200
	ISF-S500	0~10	10~50	50~100	100~200	200~300	300~500
Load Cell(mm)		0	0.02	0.05	0.10	0.20	0.40

About memory, reserved value, min captured value

About memory, reserved value, min captured value 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 11th 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.
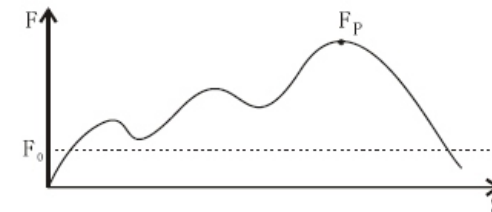
RS-232C Port and Printing

This instruments output is RS-232C, so the matched miniature printer must support RS-232C.

Illustration of test report

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

```
SD-500 TEST REPORT:____
DATE:
NO:
UNIT: N
HIDT: 420.5
LODT: 222.1
LE.SET: 10.0
01  150.2  -
02  198.3  -
03  450.5  +
04  85.5   -
05  256.8  OK
06  270.8  OK
07  266.6  OK
08  400.2  OK
09  368.9  OK
10  286.5  OK
MAX: 450.5
MIN: 85.5
AVERAGE:273.4
```

Title
Data for memo
No
Unit of value
Upper limit
Lower limit
Peak capture line

The test value or data
+ is over upper limit,
- is the lower than
lower limit, Ok is the
eligible

Max value
Min. Value
Average value

Miniature printer

1. Board display
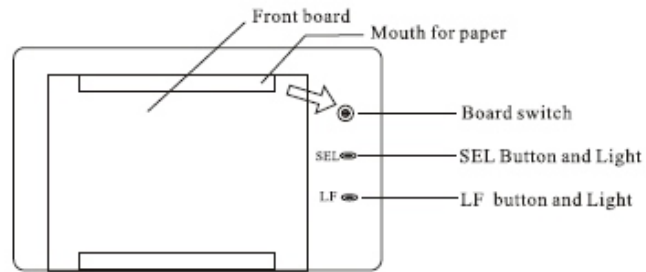
2. Miniature printer has two buttons: SEL, LF and board switch on-line/off line:
   When SEL button is green, the printer is in on-line and is waiting for receiving data. If the green light is off, printer is off-line or is treating the data. After the power is on, printer is on-line and the green light will show, "SEL", make printer transition between this two states. In printing process, if SEL is pressed, the process may be stopped temporarily. At this time, more paper can be inserted and printer can be restarted after the button is pressed again.

3. Inserting paper
   A. Pressing the board switch, open the front board.
   B. Inserting the paper and pull out part of it, please note the direction of paper
   C. Close the board
   D. Connect the power and press " SEL" to make the light off, then press "LF" to make the printer turning, meanwhile, please see if the paper is asked press "SEL" again or turn the power off.

Package List

Item	Accessory	Quantity
1	Main body	1pc.
2	Spring test stand	1pc.
3	Fine adjusting screw	1pc.
4	Lock knob	2pcs
5	Hooks	1pc.
6	Extended hook	1pc.
7	MS inner-hexad spanner	1pc.
8	Manual	1pc.
9	Qualification certificate	1pc.