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**ISF-S
DIGITAL SPRING TESTERS
OPERATION MANUAL**



Introduction

This series digital spring tester is special for testing tension & compression of spring distortion and measuring load and it also can be used to test the load of rubber and reed. This spring tester has the following features: high accuracy and high resolution; displaying test direction; blue background lamp; setting upper and lower limits; deviation value setting judgment, red and green indicator lights and buzzer automatic sound and light alarm setting; 10 groups of test data can be stored; automatic calculation and storage data average; three units of N, kgf, lbf are automatically interchangeable; with peak hold function, peak automatic release function and free setting of release time, power saving design for automatic shutdown without operation, and free setting of shutdown time. Please read this manual carefully before using the instrument, so as to make full use of the functions of the instrument and get the correct load value during the test.

Caution

1、 If you operate it incorrectly, it may damage the machine or cause a serious accident. This manual clearly points out the important matters to prevent accidents and how to use the product; please read this manual carefully before use. Keep it properly after reading. If you are testing the impact load, please select a model with a range that is twice as large as the tested impact load value.

2、 Be sure to install the frame when using.

Warning

- ① Please wear protective mask and gloves to prevent the splash material generated during the test from hurting the body.
- ② Do not use damaged or bent clamps to avoid them off or breaking down during the test and hurt the body.

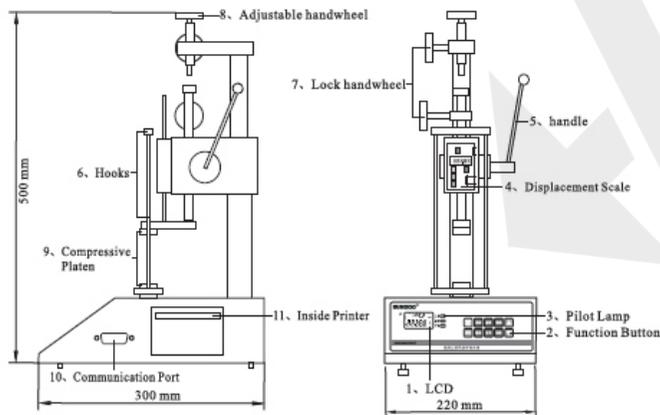
- ③ This instrument is used to test the pressure and tension generated by the compression and deformation of the elastic object. Do not release force in the direction of bending or tightening the sensor and the test frame.
- ④ Don't overload it. In order to prevent damage to the sensor caused by improper use, there is a termination device inside the machine, but it can do nothing about the impact load of overload and the load outside the two directions of tension and compression.
- ⑤ When "Error" is displayed on the LCD screen, it means that the load on the sensor has exceeded the rated load. At this time, please reduce the load immediately. Please do not load the load exceeding 5% of the rated load when starting up.

Specification

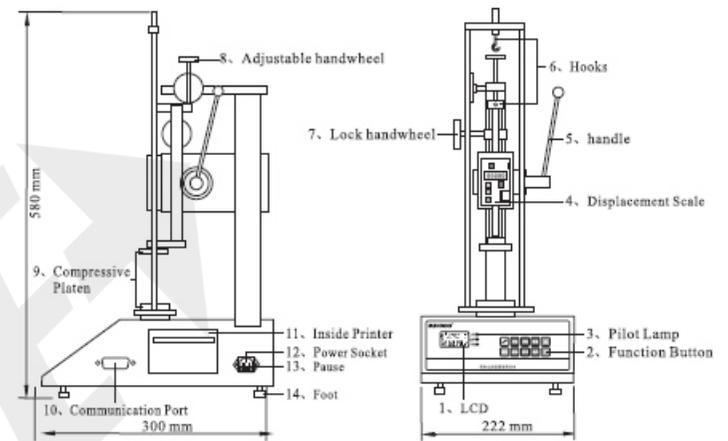
Code	ISF-S10	ISF-S20	ISF-S30	ISF-S50	ISF-S100	ISF-S200
Maximum load	10N	20N	30N	50N	100N	200N
Resolution	0.001N	0.002N	0.01N	0.01N	0.02N	0.05N
Range of digital scale	65mm			95mm		
Resolution of digital scale	0.01mm			0.01mm		
Disk diameter	Ø30mm			Ø49mm		
Maximum free length of spring	65mm			95mm		
Measuring range of force	5%~100%(maximum load)					
Accuracy of force	±1%(maximum load)					
Data output	RS232					
Power supply	220V, 50/60Hz					
Dimension	300×235×600mm			300×235×620mm		
Weight	13.2kg			17.3kg	19.1kg	

Code	ISF-S300	ISF-S500	ISF-S1000	ISF-S2000	ISF-S5000
Maximum load	300N	500N	1000N	2000N	5000N
Resolution	0.1N	0.1N	0.2N	0.5N	1N
Range of digital scale	95mm		150mm		
Resolution of digital scale	0.01mm		0.01mm		
Disk diameter	Ø49mm		Ø108mm		
Maximum free length of spring	95mm		200mm		
Measuring range of force	5%~100%(maximum load)				
Accuracy of force	±1%(maximum load)				
Data output	RS232				
Power supply	220V, 50/60Hz				
Dimension	300×235×620mm		490×300×920mm		
Weight	19.1kg	20.8kg	47.5kg		

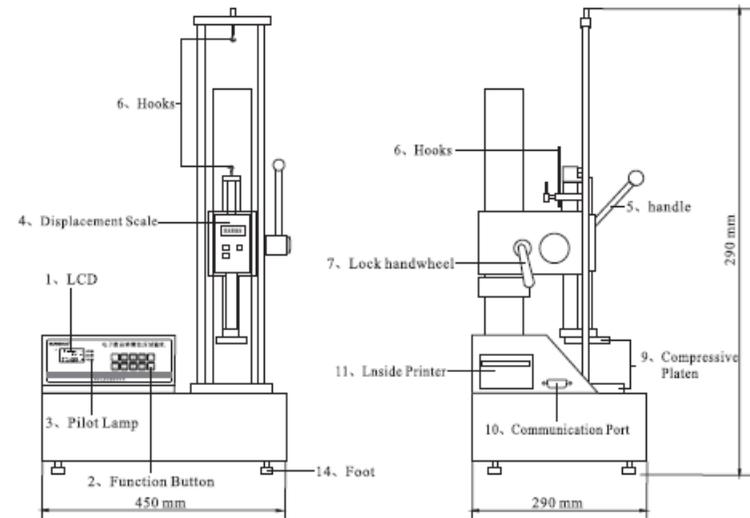
Parts and Functions



ISF-S10~30

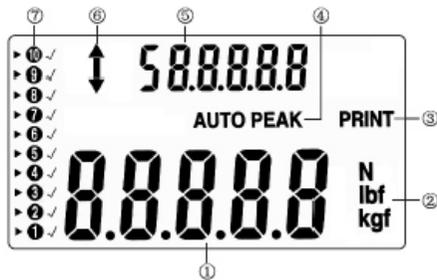


ISF-S50~500



ISF-S1000~5000

① LCD



- ① Displaying measuring value, and showing setting value in setting mode.
- ② Unit
Three units "N", "lbf" and "kgf" are automatically converted.
- ③ Print all stored data.
- ④ Peak indicates, "PEAK" means it is in the state of holding peak, "AUTO PEAK" means it is in the state of auto releasing peak.
- ⑤ Displaying saved measuring value, and function symbol of setting mode.
- ⑥ Symbol of force direction
"↓" means compressive test, and "↑" means tensile test.
- ⑦ Memory test value
"①②③④⑤⑥⑦⑧⑨⑩" is total 10 grids, every grid memory one test value;
▶ : means the grid is the saving and showing value;
√ : means the grid has saved the test value.

② Function Button

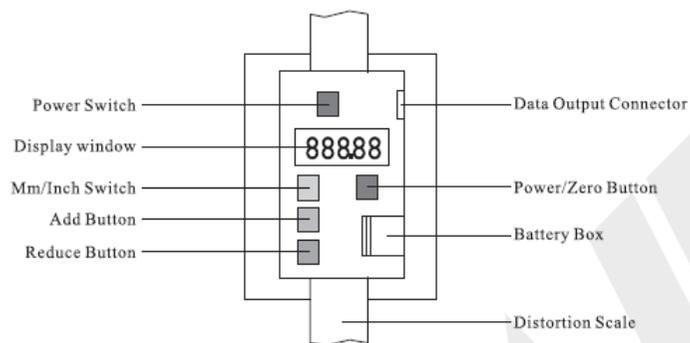
- ◆ "⏻" : Power On/Off button.
- ◆ "ZERO" : Zero Button. Press to back to zero, clean peak value or save setting value.
- ◆ "UNIT" : Unit button.

- ◆ "CLR" : Press this button to clear the data "▶" points at. All the served data can be cleared by pressing the button all along.
- ◆ "PEAK" : Switch of peak holding mode, auto-releasing peak mode, and tracking mode. The default is tracking mode when power on.
- ◆ "PRT" : Print Button. Print data at current state (view "Port Output and Print").
- ◆ "MEM" : Memory Button. Only when peak mode is not set and the tested value is not "0", measuring value can be saved by pressing this button. When under peak holding mode, the button is not available.
- ◆ "SET" : Set Button. Upper and lower limits auto-alarm setting; Minimum captured value setting; Automatic power off time setting (1-60 minutes free setting but 0 will not power off automatically); Set time of auto-releasing peak (1-10 seconds is free to set).
- ◆ "▲" : Add Button. While the instrument is operating, pressing the "▲" one time makes the symbol "▶" forwards 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. In setting mode, pressing "▲" button one time increases value, pressing above 2 seconds will increase value continuously.
- ◆ "▼" : Reduce Button. While the instrument is operating, pressing the "▼" one time makes the symbol "▶" backwards one case. In tracking mode, press "MEM" to save the test value in this 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. In setting mode, pressing "▼" button one time decreases value. Pressing above 2 seconds will decrease value continuously.

- ③ Pilot lamp of upper and lower limit with alarm.
 - Pilot lamp of upper limit with alarm
 - Pilot lamp of normal
 - Pilot lamp of lower limit with alarm(Power indicating lamp when turning on)

Under working state, when measuring value is in the set range of upper and lower limit, the normal pilot lamp " " lights indicating qualified value. When measuring value exceeds upper limit, the upper limit lamp " " lights with alarm indicating failure value. When measuring value belows lower limit, the lower limit lamp " " lights with alarm indicating failure value to remind users that this is not in the test scope.

④ Displacement Scale



Add Button: increase one scale to the current reading;
Reduce Button: decrease one scale to the current reading.

- ⑤ Handle;
- ⑥ Hooks;
- ⑦ Lock Handwheel;
- ⑧ Adjustable Handwheel;
- ⑨ Compressive Platen;
- ⑩ RS-232C port output;

- ⑪ Inside Printer;
- ⑫ Power Socket;
- ⑬ Fuse;
- ⑭ Foot.

Working environment

- ① Working Temperature: 0~40°C;
- ② Relative Humidity: 35%RH~65%RH;
- ③ No shock and corrosivity material around.

Test

Begin Test

- ① Power on
When the power is off, connect the power and press the power button to make the power on. The equipment will enter into self-checking procedure, the equipment is in normal condition. If clamps are installed on compressive platen, and weight is not over 5% of the load capacity, the screen will clean to zero automatically. But if the weight is over 5% of the load capacity, error may happen, so please use light clamps.
Power off: under state of power on, press the power button to turn off; the tester will auto-turn off according to the setting time of power off if there is no testing.
- ② Clean Zero
After switch on, press the "ZERO" button to clean to zero after the reading is steady. The range of cleaning zero is ±5% of the capacity. Pressing the "ZERO" button cleans the peak while it is in peak holding mode and to save the setting value in setting mode.

3 Choose Test Mode

The equipment provides three kinds of test modes: tracking mode, holding peak mode and auto-releasing peak mode. The tracking mode is default when the equipment is turned on and there is no "PEAK" on the screen. After pressing "PEAK" button, the screen will show "PEAK" and it is in holding peak mode, and the value showed on the equipment is the max value the sensor bears. Pressing "PEAK" button again makes the screen show "AUTO PEAK" and enter into auto-releasing peak mode. The reading is the max value the sensor can stand. The reading will be cleaned to zero according to the set time, and wait for next peak. The three mode can be exchanged by pressing "PEAK" button.

4 Set of upper and lower limit, min captured value, auto power off time and peak auto-releasing time.

The first time pressing "SET" button, the display shows "HIDT", the number frame shows current upper limit, press "▲ ▼" key to change current value;

The second time pressing "SET" button, the display shows "LODT", the number frame shows current lower limit. Press "▲ ▼" key to change the current value;

The third time pressing "SET" button, the display shows "LE.SET", the number frame shows current min captured value, press "▲ ▼" key to change the current value:

The fourth time pressing "SET" button, the display shows "P.OFF", the number frame shows current automatic power off time, press "▲ ▼" key to change the current value;

The fifth time pressing "SET" button, the display shows "A.PE", the number frame shows current set time of auto-releasing time, press "▲ ▼" key to change the current value;

The sixth time pressing "SET" button, all set value will be saved and return to the test state.

- ◆ Note: During setting process, pressing "ZERO" button can save settings and return to test state.

Test

1 Distortion and Load Test of Tensile Spring

- ◆ Turn the tester on, and make it in normal working state;
- ◆ Press "ZERO" button;
- ◆ Drive the handle upward, connect the upper and lower hooks, and adjust adjustable handle. When the displayed load approaches the capacity of spring^①, press the zero button on displacement scale;
- ◆ Please hitch the tested spring and turn the handle to the measuring distortion, then read the displayed value, which is the working load value of the spring.

2 Distortion and Load Test of Compressive Spring

- ◆ Turn the tester on, and make it in normal working state;
- ◆ Press "ZERO" button;
- ◆ Drive the handle downward to make platen touch each other, and adjust adjustable handle. When the displayed load approaches the capacity of spring^②, press the zero button on displacement scale;
- ◆ Place the tested spring and turn the handle to the measuring distortion, then read the displayed value, which is the working load value of the spring.

Finish Test

After finishing testing, take load off slowly, and turn power off for next time to use. If do not use with long time, please plug out power socket, and cover equipment with dust-proof cloth.

- ◆ Note^①: Zero distortion means the zero the scale. For accurate testing, you must zero it when the force loading close to the testing loading. For normally testing, it should be zeroed under 10~20% of the full force loading of the machine.

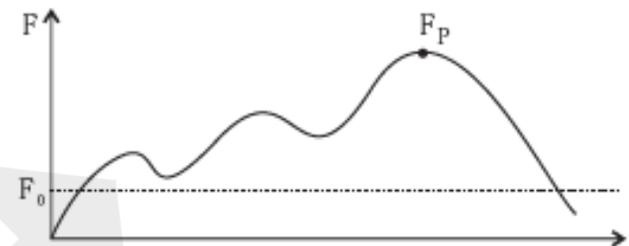
◆ Note②: It means when you zero the scale, the handle should be pressed down. The scale will show "-" value, you should use this value as "+".

◆ Appendix: Self-distortion form of load sensor:

Load range (N)	ISF-S10	0~0.2	0.2~1	1~2	2~4	4~7	7~10
	ISF-S20	0~0.4	0.4~2	2~4	4~8	8~14	14~20
	ISF-S30	0~0.6	0.6~3	3~6	6~12	12~15	15~30
	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-S300	0~6	6~30	30~60	60~120	120~150	150~300
	ISF-S500	0~10	10~50	50~100	100~200	200~300	300~500
	ISF-S1000	0~20	20~100	100~200	200~400	400~600	600~1000
	ISF-S2000	0~40	40~200	200~400	400~800	800~1200	1200~2000
ISF-S5000	0~100	100~500	500~1000	1000~2000	2000~3000	3000~5000	
Distortion(mm)	0	0.02	0.05	0.10	0.20	0.40	

Memory, Reserved Value, Minimum Captured Value

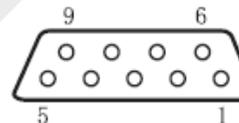
Under peak holding mode, choose suitable minimum captured value "Fo" according to tested value. During testing, the memory function will be available when measuring value exceeds minimum captured value "Fo", and the peak value will be memorized. When the value is less than "Fo", that test is completed. The peak value "Fp" will be saved, and "✓" will show in the left memory position on the screen with "▶" rising one case. When the minimum captured value is higher than measuring force, the memory function will not be available. This equipment can memorize 10 value and the first value will be replaced by value of the 11th test. You can choose the memory grid by pressing "▲▼" and measuring value saved in that grid will be showed in the small digital frame.



Port Output and Print

This equipment output is RS-232C, the matched micro-printer must support RS-232C. After testing, press "PRT" key can print measuring data, including upper limit, lower limit, minimum captured value, max value, min value and average value.

Illustration of Port



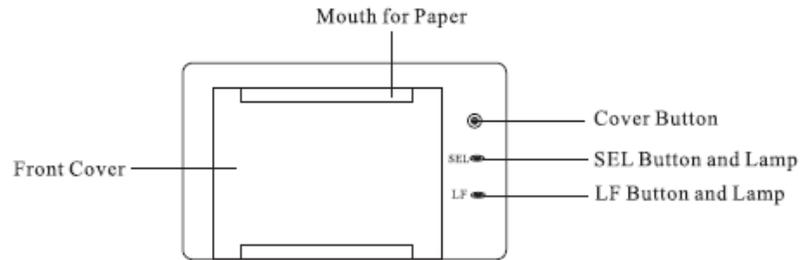
Needle	Signal	Illustration
2	TxD	output signal of SCM
3	RxD	accepted signal of SCM
5	GND	Earth signal
6	+2V	over upper limit lamp
7	+2V	OK lamp
8	+2V	lower than lower limit lamp

Print Proofs

Title	SD-500 TEST REPORT
Data for memo	DATE:
Number	NO:
Unit	UNIT:N
Upper Limit	HDT:280.0
Lower Limit	LODT:260.0
Minimum Captured Value	LE.SET:10.0
Measuring Value/Data	01 250.2 -
+ is over upper limit,	02 278.3 ok
- is lower than	03 250.5 -
lower limit, Ok is the	04 285.5 ok
eligible.	05 256.8 ok
	06 270.8 ok
	07 266.6 ok
	08 275.2 ok
	09 269.8 ok
	10 286.5 +
Max. Value	MAX:286.5
Min. Value	MIN:250.2
Average Value	AVERAGE:269.0

Micro-Printer

① Printer Panel



2 Button Function

This micro-printer has three buttons: SEL, LF and cover button. When SEL button lights, the printer is on-line and is waiting for receiving data. When SEL button not lights, printer is off-line, and is treating the data. "SEL", makes printer transition between this two states. During printing process, press SEL to stop printer, and can add paper. The print will continue by pressing SEL again.

3 Add Paper

- ◆ Open front cover by pressing cover button;
- ◆ Add paper and pull out part of it, please note the direction of paper;
- ◆ Close front cover;
- ◆ Press "SEL" to make the lamp off, then press "LF" to make the printer turning, meanwhile, please check if the paper is askew. Press "SEL" again to make printer on-line.

Cautions and Maintenance

- 1 Do not apply with 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 equipment near water, oil or other liquids. Please store the equipment in dry, cool and stable place;
- 5 Do not plug adaptor with wet hand to avoid electrical shock;

- 6 Clean this tester with soft cloth. First put cloth in the water with cleanser, then dry cloth and clean the tester. Do not use volatile chemical liquid, such as volatile oil, thinner, alcohol, etc.
- 7 Handle carefully while carrying and using the equipment;
- 8 Do not disassemble, repair or modify the tester by yourself, which may cause permanent malfunction.