



**ISF-DT Series  
Wire Tensiometer  
Operating Manual**

## 1. Description of responsibilities

Thank you for purchasing our instruments!

Tensionmeters are warranted for 12 months.

Wear parts, keyboards and measuring springs are not covered by the warranty.

## 2. Instrument Description

### 2.1 Technical Parameters

Code	ISF-DT200	ISF-DT500	ISF-DT1000	ISF-DT2000
Accuracy class	±2%FS			
Range of test force	2.0~200.0cN	5.0~500.0cN	10~1000cN	20~2000cN
Test force resolution	0.1cN	0.1cN	1cN	1cN
Width of measuring head	65mm	65mm	65mm	116mm
Factory calibrated wire diameter	Φ0.2mm	Φ0.2mm	Φ0.4mm	Φ0.4mm
Range of diameter	0.05~0.3mm	0.05~0.3mm	0.1~0.5mm	0.3~0.7mm
Compensation for diameter	yes			
Frequency of display updates	2 times/sec			
Maximum line speed	2000 m/min			
Power supply	built-in rechargeable battery			
Environmental requirements	temp: 10~45°C humidity: ≤90%RH			
Code	ISF-DT2500	ISF-DT5000	ISF-DT10K	ISF-DT20K
Accuracy class	±2%FS			
Range of test force	25~2500cN	50~5000cN	0.1~10.0daN	0.2~20.0daN
Test force resolution	1cN	1cN	0.01daN	0.01daN
Width of measuring head	116mm	116mm	116mm	216mm
Factory calibrated wire diameter	Φ0.4mm	Φ1.2mm	Φ1.2mm	Φ1.8mm
Range of diameter	0.3~0.7mm	0.4~1.0mm	0.7~1.2mm	1.0~1.8mm
Compensation for diameter	yes			
Frequency of display updates	2 times/sec			
Maximum line speed	2000 m/min			
Power supply	built-in rechargeable battery			
Environmental requirements	temp: 10~45°C humidity: ≤90%RH			

Code	ISF-DT30K	ISF-DT50K	ISF-DT60K	ISF-DT100K	ISF-DT200K
Accuracy class	±2%FS				
Range of test force	0.3~30.0daN	0.5~50.0daN	0.6~60.0daN	1~100daN	2~200daN
Test force resolution	0.01daN	0.01daN	0.01daN	0.1daN	0.1daN
Width of measuring head	216mm	216mm	216mm	216mm	280mm
Factory calibrated steel wire diameter	Φ2mm wire rope	Φ2mm wire rope	Φ2mm wire rope	Φ2mm wire rope	Φ2mm wire rope
Range of diameter	≤3mm	≤3mm	≤3mm	≤3mm	≤3mm
Compensation for diameter	yes				
Frequency of display updates	2 times/sec				
Maximum line speed	2000 m/min				
Power supply	built-in rechargeable battery				
Environmental requirements	temp: 10~45°C humidity: ≤90%RH				

### 2.2 Content of Instrument

Wire tensionmeters includes one tensionmeter, one manual, one certificate of conformity, one charger, and one gauge case.

### 2.3 Function

Suitable for testing the tension of stranding machines, winding machines, wire cutting machines, carbon fibre winding equipment, fibre optic winding equipment, fibre optic cable production equipment, glass fibre winding equipment, steel cord production equipment, steel wire rope production equipment and so on.

Automatic zeroing, manual zeroing also possible;

Memory function for recording the current real-time value (up to 10 data), for recording phase data (max., min., average);

10 calibration channels, 6 groups of calibration points to choose from;

Fine-tunable compensation, compensation value range ±10%FS, 1% for one component;

Six units g, cN, N, lb, daN, kg are automatically converted;

3 min no operation auto shutdown.

### 3.Measurement instructions

#### 3.1 Description and screen

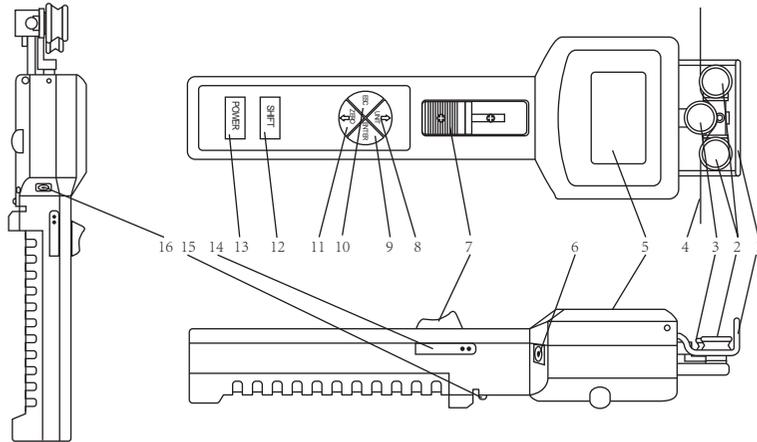


Fig.1

1.Wire Guide Frame 2.Wire Guide Wheel 3.Measuring Wheel 4.Measured Wire 5. Monitor 6.Power Supply 7.Push Slider 8.Upward Direction Key and Unit Switching Composite Function Key 9.ENTER Key and Record Data Composite Function Key 10.ESC Key and Playback Data Composite Function Key 11.Downward Direction Key and Zero Composite Function Key 12.Composite Function Key 13.Power Key 14.Clamping Wire Fixer 15.Wire Diameter Compensator

#### 3.2 Description of power-up and screen interface :

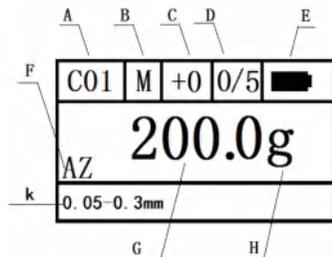


Fig. 2

**Area A:** Measurement channel display area, NT series instruments can be calibrated for 10 materials, which are stored in the measurement channels C01-C10. When calibrating different materials, the calibration can be switched according to section 4.2. The number of calibration channels can be set, see section 5.1 for details.

**Area B:** M is the data logging flag, M flashes to indicate that the instrument is in the process of phase analysis data logging; M flag is stationary to indicate that the instrument phase analysis data logging has stopped. See section 4.3 for details

**Area C:** Displays the status of the meter's fine adjustment. Instrument can be displayed on the basis of the value of  $\pm 10$  steps of numerical adjustment, each time to adjust the value of the absolute value of the full range of 1%. For example, 200g range instrument, in the display value based on the increase of 10g, need to adjust the positive value of 5 steps, then the C area shows the value of +5. For details of the settings, see section 5.4.

**Area D:** An expression of the meter's data logging function. The value before the slash indicates how many values the meter is currently logging, and the value after the slash indicates the maximum number of values the meter can log. See section 4.4 for usage. The maximum number of values the meter can record is 10, this value can be set in the meter. See section 5.8 for details

**Area E:** Battery level display area. The black portion represents the remaining charge, if it all turns white, the battery needs to be recharged.

**Area F:** AZ is the symbol for the auto zero function, the meter is set to auto zero mode as standard. Manual zeroing mode can also be selected. See section 5.5 for specific settings.

**Area G:** Area for displaying the measured value of the instrument.

**Area H:** Unit display area, units can be switched. See section 4.1 for details

**Area K:** Wire diameter compensation range. Indicates the range of line diameters measured by the meter under the current channel.

The interface with the tension trend bar is shown in the figure below: the status bar changes in proportion to the displayed value, which is more intuitive than the numerical value to show the trend of tension change.

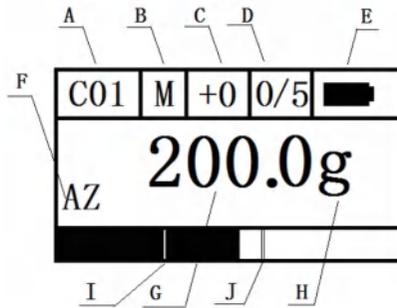


Fig. 3

**Area I:** Trend display minimum marking line.

**Area J:** The trend shows the maximum value marking line.

### 3.3 Turn Off

Press and hold the POWER key (see Fig. 1,13) for 3 seconds, the screen enters the shutdown interface and displays SHUTDOWN, release the POWER key and the instrument shuts down normally.

### 3.4 Measurement operation instructions:

Put the measured wire into the wire diameter compensator (see Figure 1, 15), both sides through the clamping line fixer fixed (see Figure 1, 14), in the measuring position to keep the instrument stable, if the instrument fails to display the zero value, please press the ZERO key to clear the zero when the value tends to stabilize. If the meter fails to display the zero value, press ZERO when the value stabilizes. Then push up to push the slider (see Figure 1, 7), the measured material will be placed between the two sides of the guide wheel (see Figure 1, 2) and the measuring wheel (see Figure 1, 3), the two guide wheels on the top, the middle measuring wheel in the bottom, gently release the slider to return to the initial position, this

time, the guide wheel and the measuring wheel will be the material to be measured clamped, as shown in Figure 4 to wait until the data is stable and then you can read the number.



Push the slider up

Fig.4

Push the slider back down

## 4. Tensiometer Function Description

### 4.1 Unit switching:

Under normal power-on condition, the unit of measurement can be switched by holding down the SHIFT (see Fig. 1, 12) key and pressing the UNIT key (see Fig. 1, 8) at the same time. the H-area (as in Fig. 2) will change the unit sequentially.

### 4.2 Switching calibration:

Under normal power-on condition, press the ESC key (see Fig. 1,10) while holding down the SHIFT (see Fig. 1,12) key to switch the calibration channel. the A area (see Fig. 2) will be changed according to the number of channels set in turn.

### 4.3 Measurement data analysis:

Under normal power-on condition, press the UNIT key, at this time M (see Figure 2 area B) flashes, representing the beginning of the phase recording, press the UNIT key again, M stops flashing, the end of the phase recording. At the same time in the bottom of the LCD screen from left to right will display the maximum value, minimum value, average value. See Fig. 5. The unit of all values is the same as the current unit.

**Area L:** maximum value, M area: minimum value, N area: average value. Press ESC key to exit to normal measurement interface.

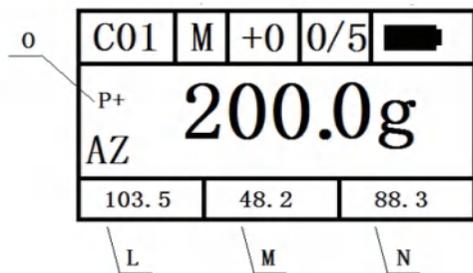


Fig.5

#### 4.4 Data storage:

In normal measurement state, pressing the ENTER key (see Fig. 1,9) allows the instrument to record the current display data. the value before the slash in the D area represents the number of data to be recorded, and the value after the slash represents the maximum number of data that can be recorded. To set the number of data that can be recorded, see section 5.8. Under normal measurement status, press ESC key to enter the interface of viewing recorded data. Press UNIT key and ZERO key to scroll up and down the recorded data, AVG stands for average value, N1,N2...stands for recorded data. Press ESC key again to exit to normal measurement interface. Press ENTER while holding down the SHIFT key to clear all recorded values.

#### 5.Parameter Setting

UNIT key is the up key and ZERO is the down key in the setting description.

Under normal power-on condition, press the ENTER key while holding down the POWER key to enter the parameter setting main menu interface. If the password protection function is set, you need to enter the password first, press the up and down keys to adjust the value, press ENTER to determine the value and switch to the next value input. As shown in Figure 6. The password is 1234.

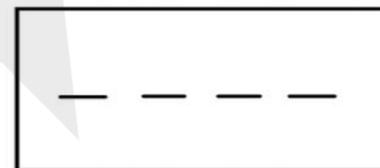


Fig. 6

After entering the main menu, switch the parameter name by up and down keys, and press ENTER to enter the corresponding parameter setting interface.

#### 5.1CAL NUMBER: Setting the number of calibration channels

Firstly, select CAL NUMBER in the main menu of parameter setting by up and down keys, press ENTER to confirm and enter the interface of channel number setting, after adjusting the number of channels by up and down keys, press ENTER to save and confirm, and press ESC to exit to the upper menu. The default setting is 1.

#### 5.2CAL POINT calibration point set: Set the calibration point of each channel.

In the main menu interface of parameter setting, firstly, select CAL POINT SET by up and down keys, press ENTER to confirm and then enter the interface of calibration point setting. Secondly, select the serial number of the channel you need to set by up and down keys, for example, C01 as shown in Fig. 7. Press ENTER to enter

C01 calibration point selection, also select the calibration point by up and down keys. Press ENTER to save. Press ESC to return to the upper menu.

Calibration point description: 1000g range instrument as an example, select the first 20,40,60,80,100 settings, the calibration of the calibration point of the weight of the full range of 20%, 40%, 60%, 80%, 100%, you need to calibrate the 5 points, that is, 200g, 400g, 600g, 800g, 1000g.If you choose 10%, 20%, 50%, then the calibration point is 100g, 200g, 500g. The default setting is 10, 50, 100.

cal point	C01
20, 40, 60, 80, 100	
10, 20, 50	
10, 30, 50	
10, 40, 70	
10, 50, 90.	
10, 50, 100	

Fig.7

### 5.3 Material calibration:

The instrument has been calibrated in accordance with the specifications of the manual when it is shipped from the factory. If the hardness and wire diameter of the customer's material are so different from the calibrated material that accurate measurement cannot be realized through fine adjustment, you can choose to carry out material calibration.

Before calibration, a small section of the measured material should be placed into the wire diameter compensator and fixed. In the parameter setting main menu by up and down keys to select CAL SET, press ENTER to enter the calibration interface, as Fig. 8.

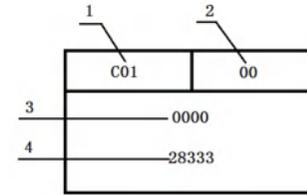


Fig. 8

After adjusting the serial number of the channel at Area 1 by the up and down keys, press ENTER to enter the calibration interface of the corresponding channel. Numerical value at Area 3 shows the current weight of the weight to be hung, and numerical value at Area 4 shows the actual measured numerical output of the current sensor, without considering the size of numerical value at Area 4. Value at Area 2 shows the serial number of the calibration point during the whole calibration process. For example, according to the range of 1000g, the calibration channel is C01, select the calibration point for 20,40,60, 80,100.Then you need to prepare 200g, 400g, 600g, 800g, 1000g weights. When the value at Area 2 shows 00, the meter position is horizontal (see Figure 9), keep the meter horizontal and stable, do not clip the line at this time, observe the value at Area 4, when the value at Area 4 changes the smallest, press ENTER to record. The value at Area 2 changes to 01, the value at Area 3 changes to 200g, hang 200g weights, the meter is in the horizontal position to clip the line (see Figure 9), keep the meter horizontal and stable for about 3 seconds, press ENTER Record. Numerical value at Area 2 becomes 02, numerical value at Area 3 becomes 400g, after doing 400g,600g, 800g,1000g records in turn, C01 automatically jumps to C02 to start the second channel calibration, the calibration process is the same. If there is no need to calibrate, press ESC key to exit to the main menu.

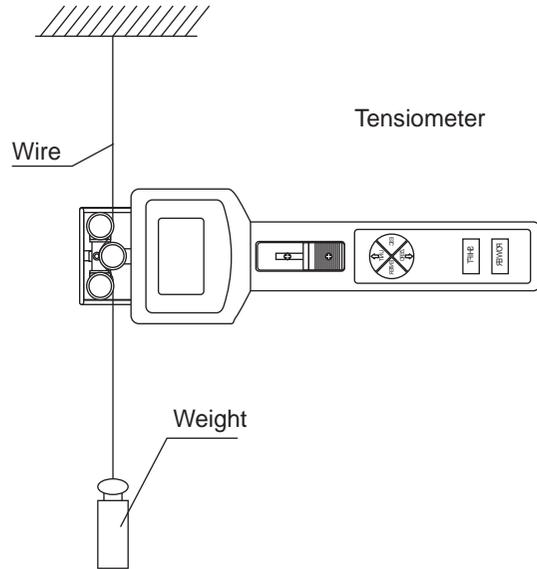


Fig.9

#### 5.4 Fine-tuning function settings

In the main menu of parameter setting, select Adjustment set by up and down key, and press ENTER to enter the compensation interface. First, select the channel sequence to be compensated by up and down keys, for example, select C01, press ENTER to enter, adjust the value by up and down keys, the value adjustment range is 0 to ±10, each value represents 1% of the measured value, for example, the measured value is 1000g, adjust the value to -5, then the instrument will be the actual measurement result minus 50 displayed on the screen. The main purpose of this setting is to compensate for the measurement error caused by hardness when measuring materials with different hardness. After selection, press ENTER to save, exit to select channel sequence interface, press ESC to exit to the main menu. In the measurement interface for the display of the value of the fine-tuning settings (see Fig 2 Area C).

Auto zero set function.

In the main menu of parameter setting select Auto zero set by up and down keys press ENTER to enter, select ON or OFF by up and down keys, press ENTER to confirm to turn on or off auto zero function. Press ENTER to confirm the selection and press ESC to exit to the upper menu. If the auto zero function fails, you can choose manual zero. In this case, every time before clamping the line for measurement, you have to manually clear the zero at the measurement position, press the ZERO key and then clamp the line for measurement.

#### 5.5 Trend Status Bar Activation Setting

In the main menu of parameter setting select Status bar set by up and down key, press ENTER to enter, select ON or OFF by up and down key, press ENTER to save and confirm after selecting, press ESC to exit to the upper menu.

#### 5.6 Trend Status Bar Range Setting:

In the main menu of parameter setting, select Bar range set by up and down key, press ENTER to enter and enter the interface of status bar range setting. First, select the channel sequence to be set by up and down keys, and press ENTER to enter the interval setting of the sequence, for example, select C01, as shown in Fig. 10. After entering the setting interface of C01, the first step is to set the value of MIN (MIN represents the lower limit value of the status bar). By pressing the ESC key to select the number, select the number through the up and down keys to adjust the value of the number, the value can be selected from 000 to MAX (MAX represents the upper limit value of the status bar) between the set value, to be less than the MAX set value. A value represents 1% of the full scale, press ENTER to save after setting. Then it automati-

cally enters the MAX value setting. The setting method is the same. The value range is greater than the MIN setting value to full scale. After setting, press ENTER to save. Press ESC key to exit to the upper menu.

Bar range	C01
MIN:0 0 0	
MAX:0 0 0	

Fig.10

### 5.7 Storage number setting:

In the main menu of parameter setting select Storage number by up and down key, press ENTER key to enter, adjust the value by up and down key, the value range 00-10, save up to 10 measurement values independently, after adjusting the value, press ENTER key to save and return to the main menu of parameter setting. The value is displayed in the measurement interface (see the value after the slash in the D area of Fig. 3)

### 5.8 Auto shutdown setting:

In the main menu of parameter setting select AUTO SHUT-DOWN by up and down key, press ENTER to enter, select ON or OFF by up and down key, press ENTER to confirm to turn on or turn off the auto shutdown function. When the automatic shutdown function is turned on, the meter will automatically shut down after 3 minutes without any operation. Press ENTER to confirm after selection, and press ESC to exit to the upper menu.

## 6. Service and Maintenance

### 6.1 Guide wheel

The guide and measuring wheels should be checked regularly. When the guide and measuring wheels are badly worn, the measuring accuracy will be affected. When ordering spare guide and measuring wheels, please inform the tensiometer of the model and serial number (on the back of the tensiometer).

### 6.2 Cleaning

When cleaning, do not use any aggressive solutions such as trichloroethylene or similar chemicals. The manufacturer's warranty will not cover damage caused by incorrect cleaning.

### 6.3 Calibration Cycle

Determining the correct calibration correct cycle is determined by the following factors:

- a. Tensiometer usage time and load.
- b. The range of deviations allowed by the customer.
- c. Changes in the permissible error compared to previous calibrations.

Thus, the calibration interval is determined by the customer's requirements and experience. Under normal usage time and load, and with good tensiometer usage habits, we recommend a calibration interval of one year.

### 7. Warranty Description

From the date of purchase of this instrument, in normal use and within one year of validity, will enjoy one year free warranty, except wearing parts (guide wheel, keyboard). In the free warranty period, due to the user's improper use and storage or other non-product quality caused by the failure of the product, the appropriate charge for maintenance. Self-disassembly of the product is not covered by the warranty.