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OPERATION MANUAL

**Model ISH-SPH
PORTABLE HARDNESS TESTER**



1. Introduction

ISH-SPH is an advanced mini hardness tester, characterized by its high accuracy, wide measuring range and simplicity for operation. It is suitable for testing hardness of the ordinary metal and widely applied in many industrial fields, such as petroleum, chemistry machinery and electric power industries etc.

2. Pre-treatment of work piece

To get the accurate measuring results, pre-treatment of work piece is required.

2.1 Work piece surface

- a) Temperature of work piece should be less than 80°C
- b) The surface roughness requirements are listed in table
- c) The small support ring or non-conventional support rings are required for work piece with curved surface radius less than 30mm, for details please refer to appendix 2.

Impact device	Work piece surface roughness
D, DC, D + 15	2μm
G	7μm
C	0.4μm

2.2 Weight of work piece

- a) No support is required for work piece weight more than 5kg.
- b) Work piece with medium-weight of 2-5kg and also heavier work piece with protruding parts or thin walls should be placed on a solid support in such a manner that they do not move or flex during the test impact.
- c) Light-weight work piece should be rigidly coupled with a non-yielding support such as a heavy base plate.

Impact device type	weight (kg)			Minimum thickness of work piece (mm)
	Needing coupled	Needing support	No need	
D, DC, D + 15	0.05-2	2-5	>5	3
G	0.5-5	5-15	>15	10
C	0.02-0.5	0.5-1.5	>1.5	1

2.3 Work piece surface hardened layer

ISH-SPH is an advanced mini hardness tester, characterized by its high accuracy, wide measuring range and simplicity for operation. It is suitable for testing hardness of the ordinary metal and widely applied in many industrial fields, such as petroleum, chemistry machinery and electric power industries etc.

Impact device	Minimum depth of surface hardened layer (mm)
D, DC, D + 15	0.8
C	0.2

2.4 No strong magnetism on the work piece surface

Strong magnetism will affect the circuit winding greatly, and affect the accuracy of testing results, so it is required to avoid strong magnetism during the testing.

3. Functions of ISH-SPH hardness tester

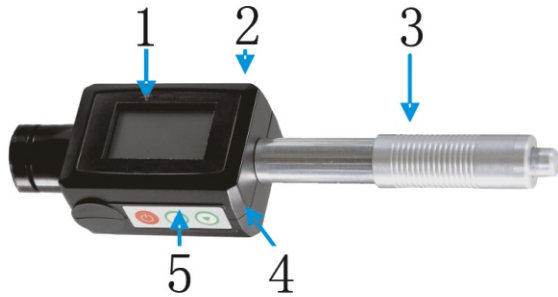
3.1 Technical specifications

Display: 112×64 LCD
 Display error: 0.5%
 Relative repetitive display error: 0.8%
 Memory: 1250
 Battery: 3.7V rechargeable lithium-battery with working more than 16 hours continuously
 Auto-off: 2 minutes without working
 Size: 158×41×26 mm
 Weight: 120g

3.2 ISH-SPH Hardness Tester

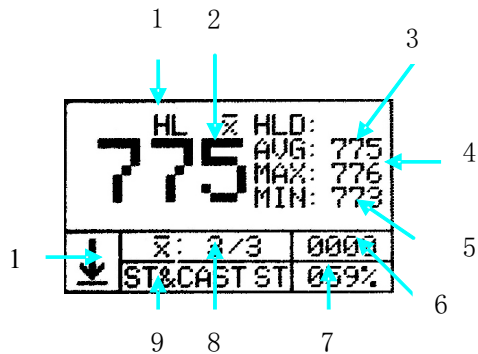
5.2.1 Main Body

1. LCD display
2. USB port/charging port
3. Impact device
4. Name plate (back)
5. Keypad



3.2.2 Function of Display

- 1. Hardness scale
- 2. Measuring value
- 3. Average value
- 4. Maximum value
- 5. Minimum value
- 6. Memory location
- 7. Battery power
- 8. Times of measurement/average
- 9. Material
- 10. Direction



3.2.3 Keypad

- ON/OFF/Menu /Esc/Confirm
- ⏪ Select/Move/Delete
- ⏩ Select/Set/Change the Display

3.3 Function of Menu

Users can change or modify the function of gauge by selecting different items of menu.
 Press ● key into menu state, then press ⏪ key or ⏩ key to select item you want to change or modify.

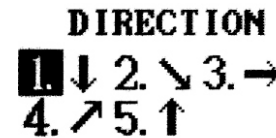
- | | | |
|------------------------|---------------------|------------------------|
| 1. MEASUREMENT | 5. SCALE | 9. OUTPUT |
| 2. DIRECTION | 6. TOLERANCE | 10. CALIBRATION |
| 3. AVERAGE TIME | 7. LOCATION | 11. CONTRAST |
| 4. MATERIAL | 8. MEMORY | 12. DEFAULT |

3.3.1 Measurement

Press ● key, the gauge will go back measurement state.

3.3.2 Direction

You can select 5 directions.



Press ● key to into the item
 Press ⏪ key or ⏩ key to select the direction
 Press ● key to confirm

3.3.3 Average Times

The average times can be selected from 2 to 8.

Press ● key to into the item
 Press ⏪ key or ⏩ key to change the average time
 Press ● key to confirm

3.3.4 Material

The gauge provides 9 types of material.

- | | |
|-------------------|------------------|
| 1. STEEL | 6. CAST ALUMINUM |
| 2. TOOL STEEL | 7. BRASS |
| 3. STAINLESS | 8. BRONZE |
| 4. GREY CAST IRON | 9. COPPER |
| 5. CAST IRON GGG | |

Press **⏏** key to into the item
Press **⏏** key or **⏏** key to select required material
Press **⏏** key to confirm

3.3.5 Scale

6 types of scale can be selected.

1. HL 2.HRC 3.HRB 4.HB 5.HS 6.HV

Press **⏏** key to into the item
Press **⏏** key or **⏏** key to select the scale
Press **⏏** key to confirm

3.3.6 Tolerance

If the measurement value is lower than the lower limit value or upper than the upper limit value, the sign “L” or “H” will appear on the LCD.

Press **⏏** key to into the item
Press **⏏** key to increase limit value
Press **⏏** key to change setting value
Press **⏏** key to confirm

3.3.7 Location

The gauge provides 1250 memory locations, from 0000 to 1249.

Press **⏏** key to into the item
Press **⏏** key to increase location value
Press **⏏** key to change setting value
Press **⏏** key to confirm

3.3.8 Memory

You can select “AUTO STORE ”or “CLOSE STORE ”states to determining store or not store measuring value.

1. AUTO STORE 2. CLOSE STORE 3. CLEAR MEMORY

If you want to clear the memory built-in ISH-SPH, you can go to the item “CLEAR MEMORY” and setup the locations you want to clear.

3.3.9 Output

Through determining the desired initial and end location number, you can output the value stored in the gauge to PC.

3.3.10 Calibration

You can modify measurement value when an error happening by changing desired value.

Press **⏏** key to into the item
Press **⏏** key to increase calibration value
Press **⏏** key to change setting value
Press **⏏** key to confirm

3.3.11 Contrast

If you want to change the LCD contrast, you can go to the item and adjust the LCD contrast.

Press **⏏** key to into the item
Press **⏏** key to increase value
Press **⏏** key to change decrease value
Press **⏏** key to confirm

3.3.12 Default

The gauge will recover the default parameters when confirm “DEFAULT” state.

3.4 Data output via USB

ISH-SPH hardness tester supplies user very powerful USB data port for transferring saved data to computer.

3.4.1 Installation of USB driver program

When the instrument is connected to computer, it will be recognized immediately and installation of USB driver program is required. Install the program from CD supplied by us as the instruction files in the CD (ISH-SPH Setup Files).

3.4.2 Installation of DataReceiver software

After the installation of USB driver, it is required to set up the DataReceiver software which is also in the CD.

3.4.3 Transferring of data

For the transferring of data, please refer to chapter 3.3.9. OUTPUT.