

# **Operating Manual**

UTEM HT20 Hardness Tester

## INDEX

|                                     |   |
|-------------------------------------|---|
| 1. Introduction                     | 1 |
| 2. Typical Applications             | 1 |
| 3. Technical Data                   | 1 |
| 4. Function of Keyboard             | 1 |
| 5. Function of Display              | 2 |
| 6. Pretreatment of Samples          | 2 |
| 6.1 Pretreatment of Samples Surface | 2 |
| 6.2 Support to test samples         | 2 |
| 7. Operation of the Instrument      | 3 |
| 7.1 Starting                        | 3 |
| 7.2 Function of Menu                | 3 |
| 7.2.1 Measurement                   | 4 |
| 7.2.2 Impact Device                 | 4 |
| 7.2.3 Direction                     | 4 |
| 7.2.4 Average Times                 | 4 |
| 7.2.5 Material                      | 5 |
| 7.2.6 Scale                         | 5 |
| 7.2.7 Tolerance                     | 5 |
| 7.2.8 Date and Time                 | 6 |
| 7.2.9 Location                      | 6 |
| 7.2.10 Memory                       | 6 |
| 7.2.11 Print                        | 6 |
| 7.2.12 Calibration                  | 7 |
| 7.2.13 Default                      | 7 |

## 1. Introduction

EMHT-20 is an advanced hand-held 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. Typical Applications

- Installed machines and permanent parts of assembled system
- Molding surface of die
- Heavy work-pieces
- Ineffectiveness analysis of pressure-vessel, turbo-generator set etc.
- Bearing and other messy produced parts at production line
- Obtaining test data requested as original formal records
- Identifying metallic material stored in a warehouse

## 3. Technical Data

|                                    |                           |
|------------------------------------|---------------------------|
| Display:                           | 128×64 LCD                |
| Display error:                     | ±0.5 %                    |
| Relative repetitive display error: | ±0.8 %                    |
| Memory:                            | 1250                      |
| Battery:                           | 2 AAA batteries           |
| Auto-off:                          | 2 minutes without working |
| Size:                              | 108×62×25 mm              |
| Weight:                            | 180g                      |

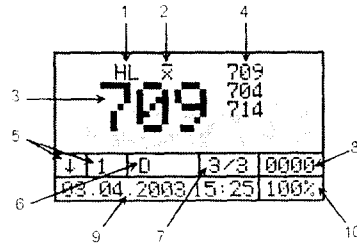
## 4. Function of Keyboard

- ① ON/OFF or Esc
- ② Move/Print data
- ③ Move/Backlight
- ④ Delete

- ⑤ Re-read
- ⑥ Menu/Enter

## 5. Function of Display

- ① hardness scale
- ② symbol of average
- ③ average value
- ④ measuring value
- ⑤ direction and materials
- ⑥ type of impact device
- ⑦ times of measurement/average
- ⑧ memory location
- ⑨ date and time
- ⑩ battery power



## 6. Pretreatment of Samples

### 6.1 Pretreatment of Samples Surface

To eliminate hardness error possibly resulted from the roughness of sample surface, the test surface should be polished smooth, neat appearing metallic luster until its roughness Ra attends no more than 2 $\mu$ m. The test surface should be clean and free from oil stain.

### 6.2 Support to test samples

- For test samples weight over 5kg, no support is needed.
- Samples of cantilever or thin shell shape and weight over 5kg to be coupled firmly and tightly with them so as to prevent themselves from bending deformation or displacement due to impact force.
- Test sample weight less than 2kg should be coupled firmly and tightly with support weight over 5kg
- Minimum weight of a test sample should not be less than 100g, minimum thickness not less than 5 mm and minimum depth of hardened layer, not less than 0.8mm.

6.3 When the test sample is a large plate, long bar or bent work piece, impact force can cause it deformed or unstable and bring about error in measurement even if its weight or thickness seems applicable. In this case reinforcement should be bound to the back of the sample surface opposite to the impact force.

6.4 Test sample should not be magnetic in property.

| Sample<br>Impact<br>Device | Sample Weight (kg) |                       |                       | Mini Thickness (mm) |                | Max Roughness |     |
|----------------------------|--------------------|-----------------------|-----------------------|---------------------|----------------|---------------|-----|
|                            | Need support       | Need to be stabilized | No Strengthening need | sample              | Hardened layer | ISO           | Ra  |
| D DC                       | 0.05-2             | 2.5                   | >5                    | 3                   | 0.8            | N7            | 2   |
| G                          | 0.5-5              | 5-15                  | >15                   | 10                  |                | N9            | 7   |
| C                          | 0.02-0.05          | 0.5-1.5               | >1.5                  | 1                   | 0.2            | N5            | 0.4 |

- Note: table shows the relationship of impact and sample

## 7 Operation of the Instrument

### 7.1 Starting

Insert the plug of impact device to the gauge and press  key turning on the power, then detailed items of available function last used will display on the LCD.

### 7.2 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. If you escape the menu, press  key.

### 7.2.1 Measurement

Press  key, the gauge will go back measurement state.

### 7.2.2 Impact Device

There are 7 types of impact device be selected according to the measurement and material.

1. D   2. DC   3. D+15   4. DL   5. C   6. G   7. E

◆ Press  key or  key to select the type of impact device

◆ Press  key to confirm

### 7.2.3 Direction

You can select 5 directions, such as:

1. ↓   2. ↘   3. →   4. ↗   5. ↑

◆ Press  key or  key to select the direction

◆ Press  key to confirm

### 7.2.4 Average Times

The average times from 2 to 8, selected by pressing

key to increase times, Press  key to confirm.

### 7.2.5 Material

The gauge provides 9 types of material,

1. STEEL
2. TOOL STEEL
3. STAINLESS
4. GREY CAST IRON

- 5. CAST IRON GGG
- 6. CAST ALUMINUM
- 7. BRASS
- 8. BRONZE
- 9. COPPER

- ◆ Press  key or  key to select the required material
- ◆ Press  key to confirm

#### 7.2.6 Scale

7 types of scale can be selected according to measurement.  
1. HL 2. HRC 3. HRB 4. HB 5. HS 6. HV

- ◆ Press  scale key or  key to select the required
- ◆ Press  key to confirm

#### 7.2.7 Tolerance

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

- ◆ Press  key to increase limit value
- ◆ 
- ◆ Press  key to change setting value
- ◆ Press  key to confirm

#### 7.2.8 Date and Time

The gauge provides real display of date and time. Through

pressing  key or  key, you can change or modify the date and time.

#### 7.2.9 Location

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

- ◆ Press  key to increase location value
- ◆ Press  key to change location value
- ◆ Press  key to confirm

#### 7.2.10 Memory

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

#### 7.2.11 Print

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

#### 7.2.12 Calibration

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

#### 7.2.13 Default

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

# UTEM HT 20 Hardness Tester

| Materials       | HL      | HRC       | HRB        | HB               |                  | HS        | HV     |
|-----------------|---------|-----------|------------|------------------|------------------|-----------|--------|
|                 |         |           |            | 30D <sub>2</sub> | 10D <sub>2</sub> |           |        |
| Steel           | 300~900 | 20.0~68.0 | 38.4~99.5  | 80~647           |                  | 32.5~99.5 | 80~940 |
| Tool steel      | 300~640 | 20.4~67.1 | 46.5~101.7 |                  |                  |           | 80~898 |
| Stainless steel | 300~800 | 19.6~62.4 |            | 85~656           |                  |           | 85~802 |
| Cast iron GG    | 360~650 |           |            | 90~334           |                  |           |        |
| Cast iron GGG   | 400~660 |           |            | 131~367          |                  |           |        |
| Cast aluminum   | 174~560 |           |            |                  | 20~190           |           |        |
| Brass           | 200~550 |           | 13.5~95.3  |                  | 40~173           |           |        |
| Bronze          | 300~700 |           |            |                  | 60~290           |           |        |
| Copper          | 200~690 |           |            |                  | 45~315           |           |        |

| No. | Materials       | D | DC | D + 15 | C | E | G | DL |
|-----|-----------------|---|----|--------|---|---|---|----|
| 1   | Steel           | ★ | ★  | ★      | ★ | ★ | ★ | ★  |
| 2   | Tool steel      | ★ | ★  | ★      |   | ★ |   | ★  |
| 3   | Stainless steel | ★ | ★  |        |   |   |   |    |
| 4   | Cast iron GG    | ★ | ★  |        |   |   | ★ |    |
| 5   | Cast iron GGG   | ★ | ★  |        |   |   | ★ |    |
| 6   | Cast aluminum   | ★ | ★  |        |   |   |   |    |
| 7   | Brass           | ★ | ★  |        |   |   |   |    |
| 8   | Bronze          | ★ | ★  |        |   |   |   |    |
| 9   | Copper          | ★ | ★  |        |   |   |   |    |

Note: ★ means available