Digital Hardness Tester

EMHT- 40

Instruction Manual

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roduction

HT-40 is an advanced mini hardness tester, characterized by its high accuracy, wide measuring ge and simplicity for operation. It is suitable for testing hardness of the ordinary metal and widely lied in many industrial fields, such as petroleum, chemistry machinery and electric power industries

nciple of Leeb hardness testing method

ory of Leeb hardness testing method

Leeb hardness testing method was firstly used in 1978. It is defined as: the rebound velocity of act body divided by the impact velocity and then multiplied by 1000. For specified metals, Leeb dness values indicate the hardness relations, and it can also be converted to other hardness scales HB, HV, HRC).

nition of Leeb hardness

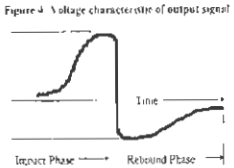
impact body, which is equipped with tungsten carbide, impacts into the work piece and rebounds k. The rebound and impact velocities are measured at the 1mm point from the work piece in the owing way: the integrated permanent magnet will produce directly proportional voltage with the act velocity. The Leeb hardness values are calculated by the following formula:

$$HL=1000\times(V_b / V_a)$$

n: HL: Leeb hardness values

V_b : the voltage produced during the rebound of impact body

Figure 1.voltage features of output signal



e Leeb hardness values can be converted to other hardness scales directly, such as HV, HRC, HRB, 3 and HS.

mbol of Leeb hardness values

st like the other hardness scales, users will get different hardness values with different impact devices, example: 720HLD≠720HLC.

ecause Leeb hardness values are produced by the responding impact devices, it should be expressed th its impact device when it is converted to other hardness scales. For example: the Leeb hardness lue 510HLD should be expressed as below when it is converted to Rockwell hardness scales HRC:

510，20 HRCLD

h:	**510**	Leeb hardness values
	20	converted hardness values
	HRC	means the converted object

re-treatment of work piece

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

ork piece surface

Temperature of work piece should be less than 80℃;

The surface roughness requirements are listed in table 3.1.1

Table: 3.1.1

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

The small support ring or non-conventional support rings are required for work piece with curved rface radius less than 30mm, for details please refer to appendix 2.

eight of work piece

No support is required for work piece weight more than 5kg.

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.

Light- weight work piece should be rigidly coupled with a non-yielding support such as a heavy base

Table 3.2.1

device type	weight (kg)			Minimum thickness of work piece (mm)
	Needing coupled	Needing support	No need	
、D+15	0.05-2	2-5	>5	3
	0.5-5	5-15	>15	10
	0.02-0. 5	0.5-1.5	>1.5	1

rk piece surface hardened layer

he work piece surface hardened layer is too thin, the impact force of short duration will go through the er and make the L-value incorrect. The proper depth surface hardened layer are listed below:

Tale: 3.3.1

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

strong magnetism on the work piece surface

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

Molding surface of die
Heavy work-pieces
neffectiveness 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
dentifying metallic material stored in a warehouse

unctions of EMHT- 40 hardness tester

chnical specifications

splay:	112×64 LCD
splay error:	±0.5%
elative repetitive display error:	±0.8%
emory:	1250
ttery:	3.7V rechargeable lithium-battery with working more than 16 hours continuously
to-off:	2 minutes without working
ze:	158×41×26 mm
eight:	120g

MHT- 40 Hardness Tester

lain Body
- LCD display
- USB port/charging port
- Impact device

Keypad

unction of Display

Hardness scale

Measuring value

Average value

Maximum value

Minimum value

Memory location

Battery power

Times of measurement/average

Material

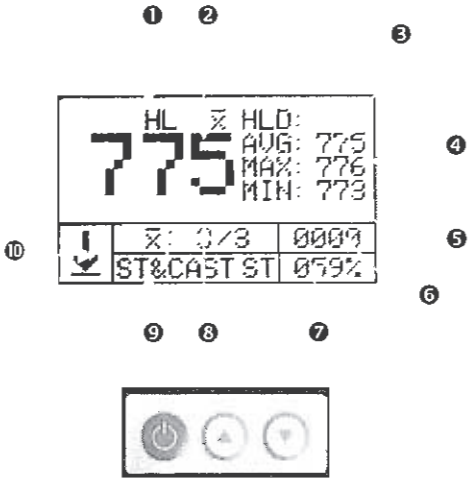
Direction

eypad

ON/OFF/Menu /Esc

Select/Move/Delete

Select/Set/Change the Display



peration of the Instrument

arting and turning off

ess key turning on the power,

en detailed items of available function

old key for more than 3 seconds, turn the instrument off.

rompt: You can press key to change the display style.

unction of Menu

sers can change or modify the function of gauge by selecting different items of menu.

ress key into menu state, then press key or key to select item you want to change or odify.

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

Measurement

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

Direction

ou can select 5 directions.

1. MEASUREMENT	DIRECTION
2. DIRECTION	1. ↓ 2. ↘ 3. →
3. AVERAGE TIME	4. ↗ 5. ↑

- Press key to into the item
- Press key or key to select the direction
- Press key to confirm

Prompt: The direction you selected must be the same as you use.

6.2.3 Average Times

The average times can be selected from 2 to 8.

```
1. MEASUREMENT          AVERAGE TIMES
2. DIRECTION              3.
3. AVERAGE TIME
4. MATERIAL
```

- Press key to into the item
- Press key or key to increase or to decrease the average times
- Press key to confirm

Prompt: 3 or 5 average times are to be recommended

6.2.4 Material

The gauge provides 9 types of material,

1. MEASUREMENT	1. ST CAST ST	5. NC IRON	9. COPPER
2. DIRECTION	2. CWT STEEL	6. CAST ALUM	
3. AVERAGE TIME	3. STAINLESS	7. BRASS	
4. MATERIAL	4. GC IRON	8. BRONZES	

- Press key to into the item
- Press key or key to select the required material
- Press key to confirm

6.2.5 Scale

6 types of scale can be selected according to measurement.

5. SCALE	SCALE
6. TOLERANCE	1. HL 2. HRC
7. LOCATION	3. HRB 4. HB
8. MEMORY	5. HS 6. HV

- Press key to into the item
- Press key or key to select the required scale
- Press key to confirm

6.2.6 Tolerance

If the measurement value is lower than the lower limit value or upper than the upper limit value, the sign

or "H" will appear on the LCD.

```
5. SCALE                    TOLERANCE
6. TOLERANCE              LOWER.   100 HL
7. LOCATION               UPPER.   900 HL
8. MEMORY
```

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

Location

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

```
5. SCALE                    SET LOCATION
6. TOLERANCE                LOCATION 0000
7. LOCATION
8. MEMORY
```

- Press key to into the item
- Press key to increase location value
- Press key to change setting value

Memory

u can select "AUTO STORE "or "CLOSE STORE "states to determining store or not store measuring lue.

5. SCALE
6. TOLERANCE
7. LOCATION
8. MEMORY

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

- Press key to into the item
- Press key or key to select the required item
- Press key to confirm

you want to clear the memory built-in EMHT-40, you can go to the item "CLEAR MEMORY" and setup e locations you want to clear.

INPUT LOC

0000 0000

- Press key or key to select the required item

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

9. OUTPUT	OUTPUT
10. CALIBRATION	START LOC. 0001
11. CONTRAST	END LOC. 0300
12. DEFAULT	

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

Calibration

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

9. OUTPUT	CALIBRATION
10. CALIBRATION	CAL. RANGE ±99
11. CONTRAST	AVG. DATA 000
12. DEFAULT	CAL. DATA ±27

- Press key to into the item
- Press key to increase calibration value

- Press key to confirm

Contrast

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

```
9. OUTPUT
10. CALIBRATION
11. CONTRAST
12. DEFAULT
```

```
CONTRAST

1 2 3 4 5
```

- Press key to into the item
- Press key to increase contrast value
- Press key to decrease contrast value
- Press key to confirm

Default

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

```
9. OUTPUT
12. CALIBRATION
11. CONTRAST
12. DEFAULT
```

a output via USB

MHT-40 hardness tester supplies user very powerful USB data port for transferring saved data to mputer.

stallation of USB driver program

hen the instrument is connected to computer, it will be recognized immediately and installation of USB ver program is required. Install the program from CD supplied by us as the instruction files in the CD MHT-40 SetupFiles).

stallation of DataReceiver software

er the installation of USB driver, it is required to set up the DtaReceiver software which is also in the (EMHT-40 USB-DataReceiver-Setup) to C: Program Files/USB-DataReciever.

ransferring of data

r the transferring of data, please refer to chapter **6.2.9. OUTPUT.**

ompts : *It is necessary to preset the proper communication port number of the computer before nsferring of data.*

airing and Maintenance

order to keep the accuracy and reliability of the instrument, it is necessary of timely evaluation and intenance.

ne battery of EMHT-40 should be charged timely to avoid damaging the battery. The proper charging me is about 4 hours.

aintenance of impact body tip

ecause of the abrasion of impact body tip, the measured values may get larger than the standard value get bad repeatedly. When it gets a larger measured value but not a bad repeatedly, it can be corrected error correction function, for details please refer to "**6.2.10 Calibration**". If it gets a larger measured lue and also a bad repeatedly, just change the impact body tip.

aintenance of instrument

MHT-40 is supplied with two year's certification of maintenance. Users should read the maintenance ms below.

ppendix

dix 1：Measuring/ converted range of impact device D:

ls	HL	HRC	HRB	HB		HS	HV
				$30D^2$	$10D^2$		
AST ST	300~900	20.0~68.0	38.4~99.5	80~647		32.5~99.5	80~940
TEEL	300~640	20.4~67.1	46.5~100.7				80~898
ESS	300~800	19.6~62.4		85~656			85~802
N	360~650			90~334			
N	400~660			131~367			
LUM	174~560				20~190		
	200~550		13.5~95.3		40~173		
ES	300~700				60~290		
R	200~690				45~315		

dix 2：Non-conventional support rings

Code	Type	Sketch	Remarks
03-03.7	Z10-15		For cylindrical outside surface R10-R15
03-03.8	Z14.5-30		For cylindrical outside surface R14.5 ~ R30

-03.10	HZ11-13		For cylindrical inside surface R11 ~ R13
-03.11	HZ12.5-17		For cylindrical inside surface R12.5 ~ R17
-03.12	HZ16.5-30		For cylindrical inside surface R16.5 ~ R30
-03.13	K10-15		For spherical outside surface SR10 ~ SR15
-03.14	K14.5-30		For spherical outside surface SR14.5 ~ SR30
-03.15	HK11-13		For spherical inside surface SR11~SR13
-03.16	HK12.5-17		For spherical inside surface SR12.5 ~ SR17
-03.17	HK16.5-30		For spherical inside surface SR16.5 ~ SR30
-03.18	UN		For cylindrical outside surface, radius adjustable R10 ~ ∞

We will not play any notification on modification of this manual.

PACKING CARD

ode	Content	Quantity	Remarks
1	Main unit with impact device D	1	
2	small support ring and brush	1	
3	Standard hardness test block	1	
4	AC Adapter/Charger	1	
5	Instruction files	1	
6	Software (CD)	1	
7	USB connecting cable	1	
8	Carrying case	1	