

DSD series Digital Durometer

User's Manual



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ST☆RR☆ INSTRU[☆]MENTS
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NOTICE

Please Carefully Read This First

1. Only authorized charger is allowed to be applied to this, otherwise it will be damaged permanently.
2. Any part of this can't be immersed in the water or be exposed to the rain, otherwise it will be damaged permanently.
3. Origin package is need for long time storage.
Temperature: $-30^{\circ}\text{C} \sim +80^{\circ}\text{C}$
Relative Humidity: 5%~95%
4. The battery should be charged fully before first using.

STANDARD

Digital Shore Durometer is in accordance with the standards as below:

ASTM D 2240

1. SUMMARY

1.1 Basic principle

By a given force, the standardized shaped steel needle is vertically pressed into the sample. When the presser foot surface is contact the sample surface, there is a length of L which is between the tip of the needle and presser foot surface. The value of L indicates the value of SHORE Hardness of the sample. Larger the value of L, smaller the sample's Shore Hardness. Conversely, smaller the value of the L, Larger the sample's Shore Hardness.

The formula is as below:

$$HD = 100 - \frac{L}{0.025}$$

H means it is types Shore Hardness.

According to this formula as above, the types Shore hardness is relative to the

displacement of the pressed needle. Through measuring the displacement of the pressed needle, the types Shore Hardness can be calculated.

1.2 Function

1) Peak value latching, Average value calculation, Low-voltage alarming.

2) Auto power off

In three minutes, if there isn't any operation, the durometer will be auto power off. Automatically shut down before the buzzer rang five times, to indicate that the machine will automatically shut down.

3) Large LCD

The high resolution industry class LCD is applied to this durometer. These make it convenient to read.

4) Menu operation and management interface

The operation and management interface is menu type. It is easy to learn and operate.

5) Fully data management

This durometer can storage, delete and print the test data. It also can set an interval to sorting samples and accomplish the basic statistics and calculations of the test data.

6) The content to be printed can be customized.

7) The large capacity rechargeable Ni-MH is built-in.

1.3 Application field

This durometer is mainly used to measure the hardness of hard rubber and hard plastic, such as: thermoplastic, hard resin, flooring, bowling. Especially for on-site hardness measurement of rubber and plastic products.

2. Specifications

Measure Range: 0 ~ 100H

Measure accuracy: $\pm 1H$

Data capacity: 500

Voltage: 3.6V (rechargeable Ni-MH battery)

Continuous working time by one time charge: about 20 hours

Battery charge time: about 3 hours

Work temperature: 0°C ~ +50°C

Work humidity: 20%~85%

Storage temperature: -30°C ~ +80°C

Storage humidity: 5%~95%

Outline size: 153mm×50mm×29mm (main body)

Weight: approx. 170g

	A/C	B/D	o/do/oo
Strut diameter of the needle(mm)	1.25±0.10	1.25±0.10	2.38±0.08
The top plane diameter of the needle(mm)	0.79±0.03		
The top sphere radius(mm)		0.1±0.01	1.19±0.05
The top cone angle of the needle	(35±0.25)°	(30±0.5)°	

3. Part list and name

3.1 Basic part

Digital Shore Durometer

Main body: 1

Charger: 1

Standardized thickness
block: 1 (under the main
body)



Fig 3-1



Fig 3-2

3.2 Optional part

Mini thermal printer

3.3 Name of every part

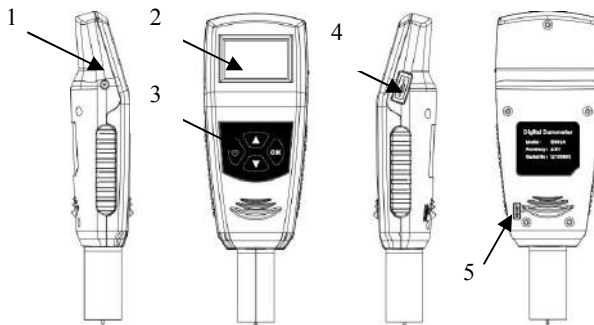


Fig 3-3

1 Charging jack

2 LCD

3 Keyboard

4 USB interface

5 Reset hole

4. Operation Instructions

4.1 Button and measure interface

4.1.1 Button



Power/Return : By pressing this button, the durometer will be power on.
By long time pressing this button, the durometer will be power off. By pressing this button, the screen will return to the upper level menu.



OK : Under the measure interface, it will enter the menu interface by pressing this button. Under the menu interface, it will enter the next menu interface. In addition, it is the confirmation button under function selection or parameters setting interface.



UP : Under the menu interface, the selection will be shifted up by pressing this button. Under parameters setting interface, the value will

increase by pressing this button.



DOWN :Under the menu interface, the selection will be shifted down by pressing this button. Under parameters setting interface, the value will decrease by pressing this button. Under some parameters setting interface, the selection will be moved down by pressing this button.

4.1.2 Interface

The large and high resolution LCD is applied to this durometer, so this durometer has the advantage of fully information display and easy to read etc.

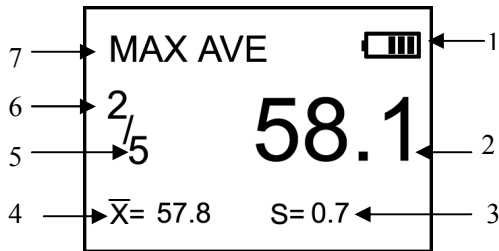


Fig 4-1

1. Battery level: Indicating the battery level or charging status
 2. Hardness value: The current measured hardness value
 3. Peak difference: The difference between the maximum value and the minimum value of this data group
 4. Average value: the average value of this data group
 5. Statistic times: the measure times of one statistic group
 6. Current times: Indicating the current times
 7. Measure mode: Indicating the current measure mode
- AVE: Average measure mode
- Max: Maximum value measure mode
- MAX AVE: Maximum average value measure mode

4.2 Menu

Digital Shore Durometer has multi-level menu interface. The system setting can be finished by simple operation. The menu structure is showed in Figure 4-2. The first page of the main menu is showed in figure 4-3. The second page of the main menu is showed in figure 4-4.

Menu	calibration	
	Test setup	Test mode
		Test times
		Tolerance
		Grubbs error
		Workpiece
		Well Time
	System setup	Date/ Time
		Backlight Time
		Key Sound
		Alarm Sound
	Memory	Browse A to Z
		Browse Z to A
		Browse select
		DeleteSelec
		Delete All
	Printing setup	Auto Print
		Print Items
		Print selected
		Print All
	information	

Fig 4-2

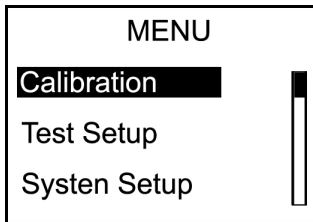


Fig 4-3

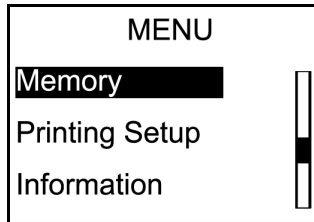


Fig 4-4

4.2.1 Calibration

Pressing button “OK” to enter the menu, select “Calibration”, press button “OK”. The durometer can be calibrated by Glass plate, standardized thickness block or other rubber

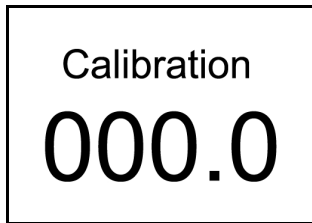






Fig 4-5

whose hardness is known. Make the press needle of the durometer press on the glass plate, standardized thickness block or other rubber whose hardness is known. Keeping the presser foot contact the samples closely for a while to stabilize, the LCD show the hardness value. If the hardness value is different from the theory value (calibration value), please enter the theory value. If the glass plate is applied, please enter 100. If the standardized thickness block is applied, please enter 50. If the rubber whose hardness is known is applied, please enter the rubber's hardness. Values enter method: under the enter value status, the corresponding position will flash, press "" to adjust the number, press "" to shift to the next position, press "" to abort the calibration, press "" to confirm the calibration.

4.2.2 Measure setting

Under measure setting, the measure mode, measure times, tolerance limit, on or off of gross error processing setting, sample code can be set. The first page of measure setting menu is showed in figure 4-6. The second page of measure setting menu is showed in figure 4-7.

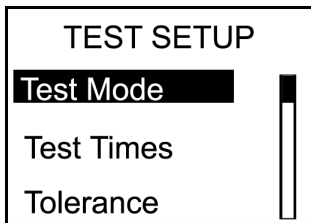


Fig 4-6

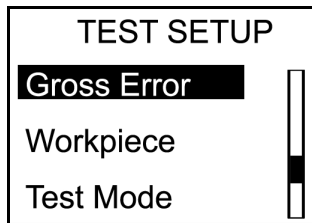


Fig 4-7

4.2.2.1 Measure mode

Under the menu of measure mode, there are three kinds of mode: Average value mode, maximum value mode and maximum average value mode.

1. Average value mode: During one sampling process, the durometer will record 20 values and calculate the average value of this 20 value automatically. The average value will show on the screen. Under this mode, the statistic times can be set. After one measure process is finished, the durometer will calculate the average value and peak difference of the data until now automatically. If the statistic time is meet, the last average value will be saved as the measure result.

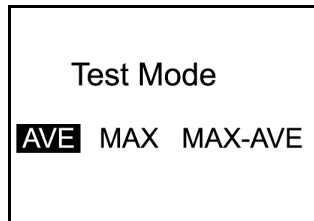






Fig 4-8

2. Maximum value mode: During one sampling process, the durometer will record 20 values automatically and take the maximum value as the current result. Under this mode, the statistic times can't be set.
3. Maximum average value mode: During one sampling process, the durometer will record 20 values automatically and take the maximum value as the current result. Under this mode, the statistic times setting can be set. After one measure process is finished, the durometer will calculate the average value and peak difference of the data until now automatically. The average value of maximum value of every measuring will be calculated and this value will be taken as the last result.

4.2.2.2 Measure times setting

The statistic times can be set under this menu.

The statistic times will increase 1 by one pressing of button “”. The statistic times will decrease 1 by one pressing of button “”. The continuous increasing or decreasing will be realized by keep pressing the button “” or “”. The maximum statistic times setting is 9.

4.2.2.3 Tolerance limit setting

Under this menu, the tolerance limit can be set. When the measuring data is exceed the setting value, the icon of “!” will be showed on the LCD

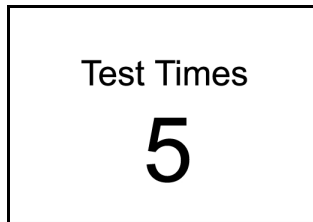


Fig 4-9

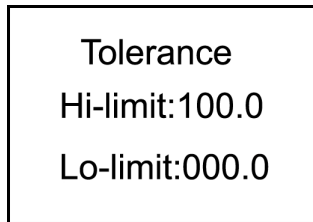


Fig 4-10

and it will flash. If the alarm function is turn on, the durometer will make the alarm sound.

4.2.2.4 Grubbs error

Under this menu, the grubbs error handling can be set to on or off during the measuring process.(the grubbs error handling is available only under the average mode and maximum average mode).If the grubbs error handling function is turn on, the grubbs error analysis will be applied to the current group when a statistic group is formed(the measure times meet the setting time),and the gross error data will be taken as invalided data to be abandoned during the calculating of average value and peak difference. If the auto-print function is turn on, a symbol of “!” will be

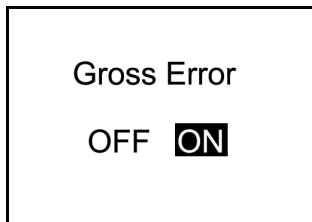


Fig 4-11

marked after the gross error data. If the grubbs error handling function is turn off, the grubbs error analysis will not be carried out after the statistic group is formed, all data of the statistic group will be taken as valid value to calculate the average value and peak difference.

4.2.2.5 Sample code setting

When several samples is need to be measured, the samples can be coded (figure 4-12). The value of setting position will increase 1 by one pressing of button “▲”. The position shift to the next position by one pressing of button “▼”. The coded range is 00-99. When the date saved, the sample code saved too. The



Fig 4-12

samples number corresponding to the data can be printed (figure7-2). It also can be looked up during data browsing (figure4-21).

4.2.3 System Setup

Under system setting menu, the date/time, backlight time, on or off of key sound, on or off of alarm sound can be set.

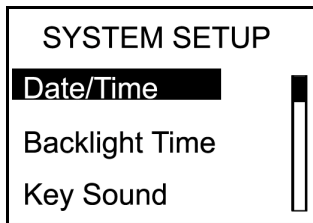


Fig 4-13

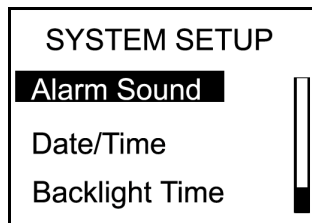







Fig 4-14

4.2.3.1 Date/time setting

Under this menu, year, month, day, hour, minute, second can be set. The selection will increase 1 by one pressing of button “”. It will return to 1 when it exceeds the range. The continuous increasing of 1 can be realized by long pressing of the button “”. The selection will shift to the next one by press button “”. The setting will be confirmed by press button “”. The setting will be aborted by press button “”.

4.2.3.2 Backlight time

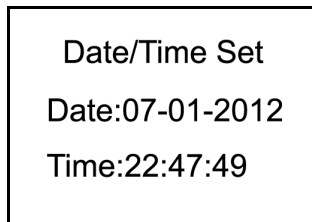


Fig 4-15

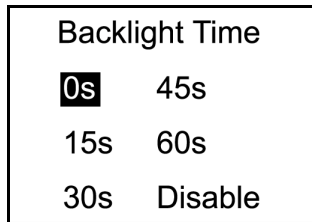


Fig 4-16

Under this menu, the continued lighting time of the backlight can be set.

0s: The backlight will be turned off all times. 15s, 30s, 45s, 60s.

Disable: the backlight will light all the time.

The selection will be modified by pressing button “” or “”. The selection will be confirmed by press button “”. The selection will be aborted by press button “”.

4.2.3.3 Key sound setting





The key sound can be turn on or off. The selection will be modified by pressing button “” or “”. The selection will be confirmed by press button “”. The selection will be aborted by press button “”.



Fig 4-17

4.2.3.4 Alarm Sound

If this function is set as on, the durometer will make a sound of alarm when the data is exceed the tolerance limit.








The selection will be modified by pressing button “” or “”. The selection will be confirmed by press button “”. The selection will be aborted by press button “”.



Fig 4-18

4.2.4 Storage management

4.2.4.1 Browse A to Z

The first page data will be show when enter this menu (8 data per page).it will turn to the next page by pressing button “”. The selection will be shifted by pressing button “”. The measure date/time/sample code of the selected data can be show by pressing button “”.

4.2.4.2 Browse Z to A

The last page data will be show when enter this menu(8 data per page).





001 60.5	005 2.9
002 29.7	006 1.3
003 55.1	007 80.7
004 89.7	008 100

Fig 4-19



001 60.5	005 2.9
002 29.7	006 1.3
Date: 12-02-2012	
Time: 10:08 WP15	

Fig 4-20

4.2.4.3 Browse Select

The range of data to be browse should be setup under this menu. The first page of selected data will be show by pressing button “”. It will turn to the next page by pressing button “”. The selection will be shifted by pressing button “”. The measure date/time/sample code of the current data can be shown by pressing button “”.

4.2.4.4 Delete Select

The range of data to be deleted should be setup under this menu. The selected data will be deleted by pressing button “”. It will be aborted by pressing button “”.

BROWSE SELECT

Range:1 To 012

From:000 To 000

Fig 4-21

DELETE SELECT

Range:1 To 012

From:000 To 000

Fig 4-22

4.2.4.5 Delete All

The prompt window will be pushed out under this menu. All data will be deleted by selection of “YES”, and this operation will be aborted by selection of “NO”.

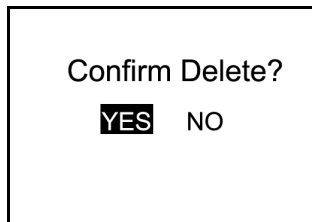


Fig 4-23

4.2.5 Print Setup

The data saved in the durometer can be printed by the thermal printer.

4.2.5.1 Auto Print

The durometer will send the data to the thermal print after the finishing of one statistic group if is set to "on".

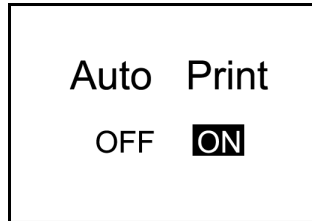




Fig 4-24


4.2.5.2 Print Items

Select the date/time will be printed.

4.2.5.3 Print Select

Firstly, the range of data to be printed should be set. After the setting is finished, the print command will be carried out by pressing button “”. The print command will not be carried out by pressing button “”.

Print Items

Date: OFF 


Time: OFF 

Fig 4-25

Print Select

Range:1 To 024

From:000 To 000

Fig 4-26

4.2.5.4 Print All

The prompt window will be pushed out under this menu. All data will be printed by selection of “YES”.

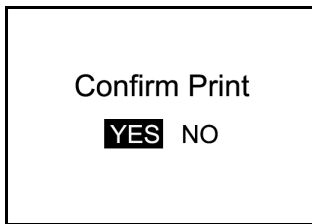


Fig 4-27

4.2.6 Information

In this menu the software version ,date and Sn. will be shown.

5 Low-voltage alarming and recharge

The durometer will be recharged by the packaged charger. The durometer will not be auto power on during recharging. The charging status will show on the measuring interface by hand power on. The moving of the battery level icon line indicate it is charging now. If the icon fill by all line, it means the charging process is finished. If the power is low, the battery level icon will flash to prompt to be recharged in time.

6 Reset

Durometer reset: if the software abnormal is happened, the durometer will reset automatically.

Hardware reset: the durometer can be reset by the hardware reset under the crash. The reset button is local in the hole of the back shell.

7 Data printing

Digital Shore Durometer can connect to the special mini-thermal printer to print the hardness result report. The mini-thermal printer is optional part. If it is needed, please contact the distributor. The printer should be put near to the durometer and the distance shouldn't be over 3m.



Fig 7-1

7.1 Format of report

A full report is as the figure 7-2.

Note:1.the print content can be customized by the relative menu

The date/time in the report content is the measuring date/time. The date/time at the end of the report is the print date/time.

7.2 Print report

You can select several modes to print a test report.

7.2.1 Auto-print

The auto-print command will be carried out during

History Test Report		
1	60.5HD	Workpiece:15 Date/Time:24/04/2012 18:02
2	29.7HD	Workpiece:15 Date/Time:01/01/2012 00:05
3	55.1HD	Workpiece:15 Date/Time:01/01/2012 00:05
4	89.7HD	Workpiece:15 Date/Time:01/01/2012 00:05
5	2.9HD	Workpiece:15 Date/Time:01/01/2012 00:31
6	1.3HD	Workpiece:15 Date/Time:01/01/2012 00:31
7	80.7HD	Workpiece:15 Date/Time:01/01/2012 00:16
8	100.0HD	Workpiece:15 Date/Time:01/01/2012 00:30
9	100.0HD	Workpiece:15 Date/Time:01/01/2012 00:30
10	100.0HD	Workpiece:15 Date/Time:01/01/2012 00:00
Print Date:05/01/2012 Print Date:15:43:55		

Fig 7-2

measuring if it is turned on. The durometer will send the data to the thermal printer after one statistic group is finished.

7.2.2 Concentration print

The data can't be printed during measuring. You can print the data later.

There are two options under this mode: "print selected data" and "print all data" explained as above.

8 Data storage

This durometer can storage 500 group data at most (one group data include: one hardness value, the date/time/sample code).if 500 group data have been saved; no more data can be saved. You need to delete part or all data. If 500 group data have been saved, the screen will display "M FULL" under the measuring interface.

9 Hardness testing

Please press the needle on the sample and make sure the presser foot is contact closely to the sample. When the data is stable, the buzzer will make a sound and the value will show until the next measuring.

Current measuring mode: maximum average value mode

Current measured value: 58.1H

Current statistic times: 5

The measured number: 2

Current average value: 57.8H

Peak difference: 0.7H

Multi-point measuring will be realized by repeating above steps.

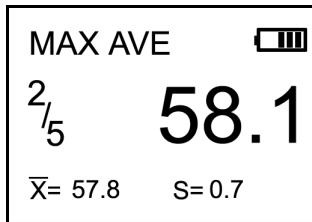


Fig 9-1

10 Maintenance and repair

- 1) This durometer should avoid shock or heavy pressure and can't be exposed to high-intensity magnetic field, high humidity or oil environment.
- 2) Because the print paper is heat sensitive paper, the paper should avoid high temperature, and direct light. If the print data need to be stored for long time, please make a copy in time.
- 3) When there are any abnormal phenomenons, please don't try to disassemble or adjust any fixed part. You should fill the warranty card and contact our maintenance department or maintenance agency authorized by our company. Normally, the durometer will not stay in the maintenance department over one week.

11 Disclaimer

Our company and agency authorized by our company is not warranty under the condition as below, but can be paid maintenance:

- 1) The damage is caused by not in accordance with the guider to connect, maintain, store.**
- 2) Out of guarantee time.**
- 3) The serial number on the warranty card isn't conforming to the serial number on the durometer.**
- 4) The durometer is disassembled or repaired by the agency which hasn't be authorized by our company.**
- 5) The durometer is damaged by human factor or accident such as it is an un-authorized charger, high temperature, water penetration, mechanical damage, broken damage.**
- 6) The damage cause by transport, loading and unloading during the process of sending back to rework by the customer.**
- 7) The damage caused by irresistibility such as earthquake, fire etc.**

Warranty Card

Description: Digital Durometer

Model: _____

User: _____ Tel: _____

Add: _____

Agent: _____ Tel: _____

Date: _____

Warranty Description

Please use our product exactly according to our user's manual.

All products sold by our company or authorized dealer are covered by 12 month warranty.

Anthropogenic causes, irresistible natural factors cause the product damage, our company will not warranty.

Model	Type
DSD-A	A
DSD-D	D
DSD-C	C
DSD-B	B
DSD-oo	OO
DSD-o	O
DSD-do	DO