

DX-320HC Coercive Force Meter

User's Manual

(Please read this manual carefully)



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Statements

Dear Customers:

Welcome to be our customers. It is great honor for us that you purchase the DEXINMAG (R) Magnetic Measuring Instruments. We provide this User Manual with the instrument. Please read this User Manual carefully before put the instrument into use, which will help you make better use of it.

Please keep this User Manual properly as part of the instrument, so that the operators can refer to it whenever needed.

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Packing List					
Name	Coercimeter				
Model	DX-320HC				
Quantity	1 SET				
S/N					
Software version					
List	Name	Model	Qua.	Configuration or Optional	Remarks
	CONTROL UNIT	DX-320HC	1 SET	√	
	FLUXMETER	DX - 210B	1 SET	√	
	POWR SUPPLY	DX-2012SD	1 SET	√	
	Test platform support frame		1 SET	√	
	Test Platform		1 SET	√	
	Software		1 PCS	√	Installed in computer
	Industry computer	ADVANTECHIPC-510	1 SET	√	
	Monitor	Lenovo 19.5'	1 SET	√	
	Standard Cabinet	600mm*600mm*900mm	1 SET	√	
Optional	Sample fixture	Customized according to samples	1 SET	×	
	Measuring coils	Customized according to samples	1 SET	×	Built in test platform
Accessories	Reference sample	Pure iron rod	1 PCS	√	
	Patch Board		1 PCS	√	
	Power Line		1 PCS	√	
	25pin Connect Line		1 PCS	√	
	User Manual		1 PCS	√	
	Warranty Card		1 PCS	√	
Packed by:			Recheck by:		
Date:			Date:		

Remarks: “√”means standard configuration, and “×”means optional and need extra cost.

Chapter 1: System Overview

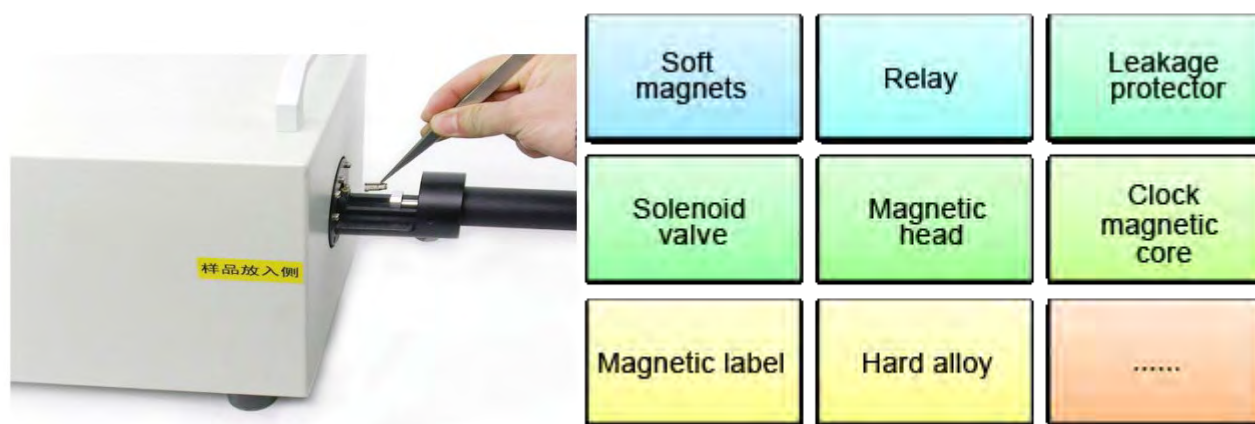
1.1 Overview

DX-320HC Coercimeter is specialized in measuring the coercivity of soft magnets. The measured samples are soft magnets with shape of strip, bar and sheet, and magnetic components such as relay, electromagnet valve, magnetic head and so on. It can visually evaluate the magnetic change of magnetic components during the workmanship (such as electroplating, annealing and welding); and also be used for magnetic measurement of magnetic label, magnetic anti-forgery ink and cemented carbide.

DX-320HC Coercimeter adopts vibration sample zero flux detection sensor, with high sensitivity and accuracy. It can test sample by operating the panel under the condition of stand-alone machine and also test by upper computer software control.

The test system confirms to GB3656-2008, GB13888-2009 and IEC 60404-7.

1.2 Application Fields

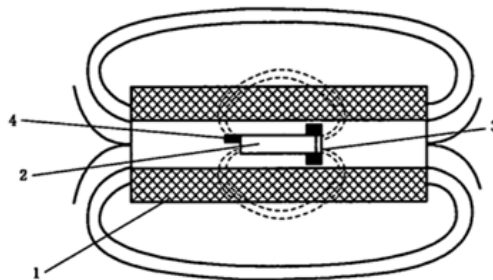


1. Test sample category: soft magnets such as electrical pure iron, precision alloy, martensitic
2. Test sample shape: strip, sheet and rod.
3. Directly test the coercivity of soft magnet components such as relay, solenoid valve, magnetic head, leakage protector, magnetic label as so on. (Equip with measuring fixture).
4. Test range: 5~1000A/m.
5. Sample size: maxΦ57mm*200mm, Min: 20μm x 1mm x 30mm (equip with customized test platform)

1.3 Measuring Method

1.3.1 Magnetic flux measurement

1. Adopt gradient magnetic field over zero method.
2. Intelligent change range and digital amplification technology ensure high signal resolution.
3. Different measuring coils can be changed, the minimum test sample size is 20μm x 1mm x 30mm.



1.3.2 Magnetic field measurement

1. Current method: realize by measuring the current of solenoid current.
2. Power supply dynamic change range to meet large current output and guarantee high measurement resolution and accuracy.
3. Magnetic field minimum resolution: 0.01A/m.

1.4 Hardware Parameters

1. 4.1 DX-320HC Coercimeter(Main frame)

Instrument adopts ARM control technology, a variety of signal processing algorithm, fast fuzzy algorithm, digital filtering algorithm, intelligent ΔB control technology.

The system supports three measurement modes: fine mode, fast mode and smart mode.

S/N	Modes	Explanations
1	Fine mode	It is the common (preferred) test mode.
2	Fast mode	It is suitable for measuring samples with the same material and the same size, which can greatly reduce the test time; Instructions and prerequisites: 1. The test platform and cabinet cannot be moved or rotated. 2. Use fine mode to continuously measure the same sample more than 2 times;
3	Smart mode	It has a certain acceleration effect on the tested samples of the same material and size. Instructions and prerequisites: 1. The test platform and cabinet cannot be moved or rotated. 2. The electromagnetic environment around the equipment is relatively stable (such as laboratory);

Notes: Press the number key "4" to set the coercivity range, which can improve the test accuracy and speed.

Test accuracy: Fine mode > Smart mode > Fast mode;

Test speed: Fast mode > Smart mode > Fine mode;

1.4.2 DX-2012SD POWER SUPPLY

Items	Specifications
Output voltage	0 ~ ±50V
Output current	1mA ~ 10A (thirteen automatic ranges, dynamic smoothly change ranges)
Current fineness	< 0.1%×current range
Current stability	Superior to 0.05%

1.4.3 DX-210B Fluxmeter

Items	Specifications
Display	4½ digits
Integral capacity	0.1 μF
Input resistance	100 k、, 10 k, 10 k, 10 k
Range	40mVs, 4mVs、, 0.4 mVs, 0.04mVs
Resolution	0.01, 0.001, 0.0001, 0.00001 mVs
Accuracy	1% reading±4uVs(10Hz-10kHz); ±5% reading±4uVs(2Hz-10Hz:10kHz-50kHz); Integrator drift: N/A.
Frequency rang	2 Hz to 50 kHz

1.5 Technical Data

1.5.1 Working Environment

Parameters	Specifications
Input power	Single-phase 200~240V, 20A, 50Hz
Total power	About 2000w
Environment	Temperature: 23±5℃; Humidity: 30~75%RH
External magnetic field interference	Absolutely avoided
Thermal balance time	10 minutes

1.5.2 System Parameters

Parameters		Specifications
Max. Magnetic field		50KA/m (measure general soft magnet components)
Magnetic field resolution		0.01A/m
Measurement range		5-1000 A/m(equip with 3 kinds of coil)
Accuracy		±2%
Repeatability	Reference sample	Superior to ±0.5% (when measure electric pure iron, with size of diameter 10mm, length 100-200mm).
	Magnetic components	±1%,±0.18A/m
Test period		1min~3min

Chapter 2: Construction and Installation

2.1 System Composition

DX-320HC Coercimeter is composed of industry computer, DX-320HC CONTROL UNIT, DX-2021SD POWER SUPPLY, DX-210B Fluxmeter and test platform.

2.1.1 Equipment mainframe



2.1.2 Test platform:

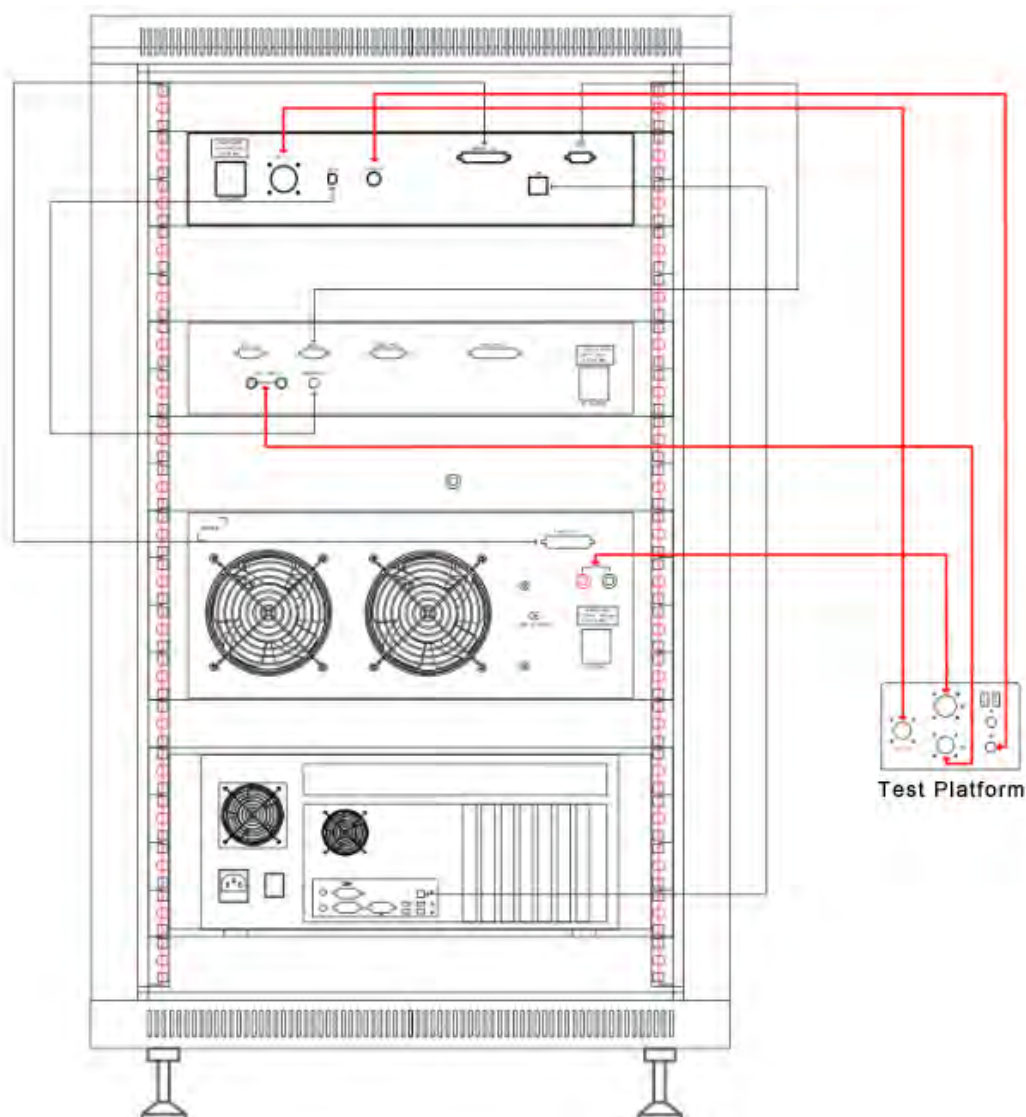
It is composed of solenoid, detection mechanism and feeding fixture.

S/N	Name	Explanations
1	Solenoid	Wind the multi-layer winding wire on the piecing frame, current through wire to produce magnetic field in the inner solenoid to magnetize tested soft magnet components.
2	Detection device	It is composed of motor, transmission mechanism and detection mechanism. The detection mechanism is installed on the transmission mechanism, with the drive of motor, detection mechanism fast and accurately moves along with the linear guide-way to detect the work-piece and send the data to DX-320HC Coercimeter for processing and displays on the LCD.
3	Feeding fixture	It is composed of pressing module, adjust module and fixture box, which is used for locating work-piece rapidly and accurately.

2.2 Installation Conditions

Parameters	Specifications
Input power	Single phase 220V±20V, 50Hz
Site requirements	For cabinet: floor space 0.6m*0.6m, height 1.2m, bearing not less than 100kg; For test platform: floor space 0.4m*1m, height 0.4m, bearing not less than 100kg;
Environment	Temperature: 23±5℃; Humidity: 30~75%RH
External magnetic field interference	Absolutely avoided
Thermal balance time	10 minutes

2.3 System Connection Diagram



Chapter 3: Operation



3.1 Safety Tips



CAUTION:



To make sure the safety of operator and machine, please make sure checkout the machine according to the following steps before power on the machine.

3.2 Checkout before POWER ON

Steps	Operations	Graphic	Remarks
1	Make sure the power switch on the front panel of all machines are on the state of off (O:OFF).		
2	Check whether the cables of computer, monitor are well connected or not.		Please connect the cable according to relevant manual.
3	Check whether the cables on rear panel of DX-320HC cabinet are connected correctly or not. Cables between cabinet and test platform are connected correctly or not.		Please refer to "System connection diagram in chapter2.
4	Check whether the input AC voltage is the same as the indicated voltage on the computer, monitor and instrument.		For the input voltage of computer and monitor, please refer to relevant product marks.



3.3 POWER ON

To make sure the safety of machine, please power on the machine according to following steps.

Steps	Operations	Graphic	Remarks
1	Turn on total power of cabinet, monitor and computer and wait for the operating system start normally.		
2	Run DX-320HC software: Double click the icon of "DX-320HC" on the desk.		
3	Turn on CONTROL UNIT, turn on Fluxmeter		After the DX-320HC CONTROL UNIT is started, complete the startup process within 5 seconds.
4	Turn on DX-2012SD POWER SUPPLY		The indicator lights up after it is turned on

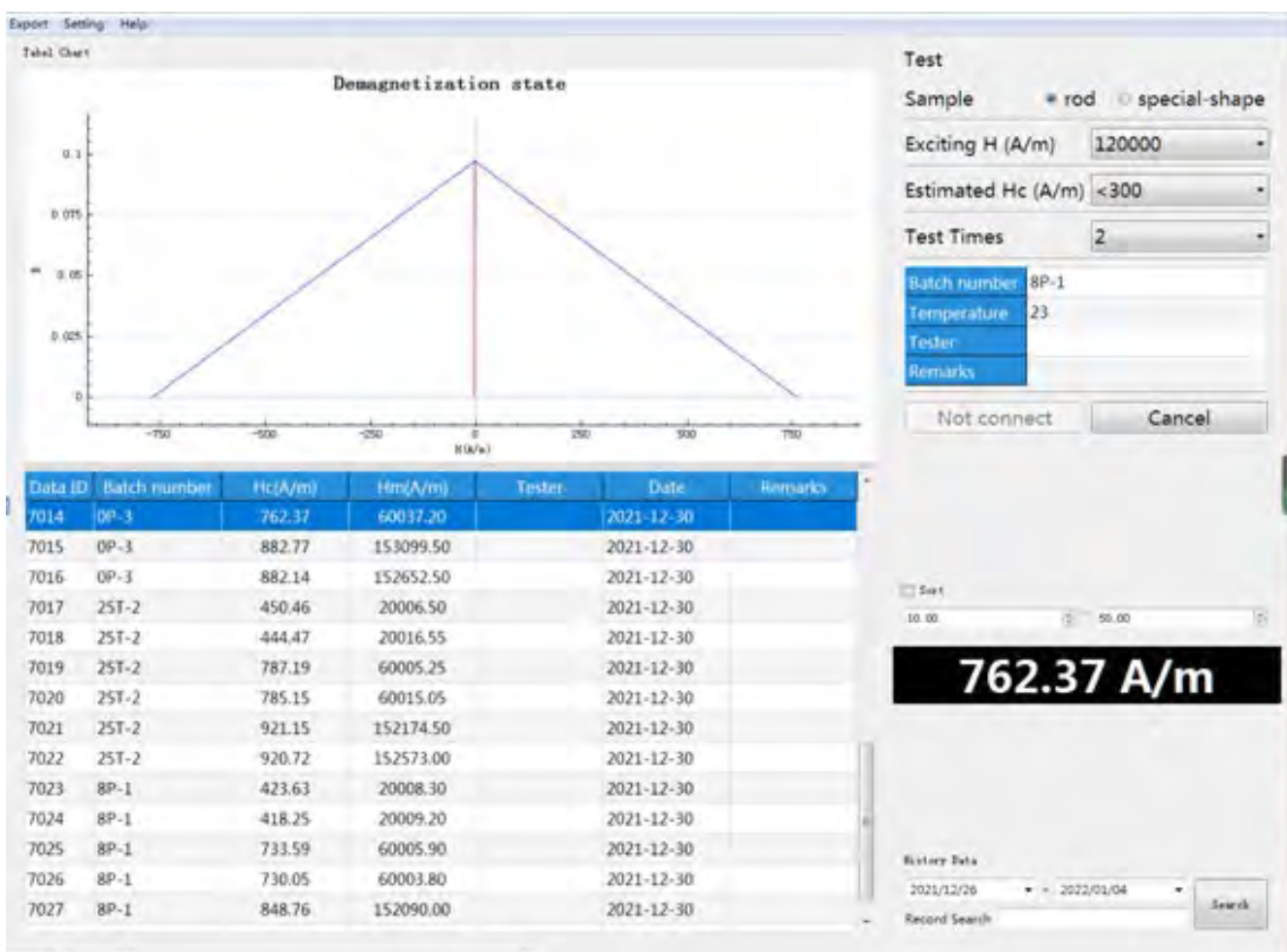
3.4 POWER OFF

To make sure the safety of machine, please power OFF the machine according to following steps.

Steps	Operations	Graphic	Remarks
1	Turn off DX-2012SD POWER SUPPLY		The indicator turns off after the device is turned off
2	Turn off Fluxmeter, turn off CONTRL UNIT		
3	Turn off computer and monitor.		
4	Turn off cabinet total power.		

3.5 Measuring Software

3.5.1 Software interface mainly contains: Menu bar, Graphic display bar, Measure data bar and Parameter input and control bar.



3.5.2 Software Parts Set and Functions

3.5.2.1 Menu Bar

Main Menu	Functions
Export	It is used to export the test data which displayed in current measure data bar in EXCEL format.
Setting	It is used to set control parameters related to measurement. Users generally do not use it directly.
Help	It includes Website, Calculator and About.

3.5.2.2 Graphic Display Bar

It is used to display measured graphic, display the demagnetization curves of two magnetic field directions after finished testing.

3.5.2.3 Measure Data Bar: Used to display current measure data and measure information.

Position	Functions
First line	Data ID: display the data S/N of a single measurement. Batch number: filled by user Hc (A/m) : measured coercivity value Hm (A/m) : actual max excitation magnetic field Tester, Date, Remark: filled by user
Data table line	To display the current test data, right-click a row to delete the current test data.

3.5.2.4 Parameter input and control bar

(1) Record information

Category	Parameters	Explanations
Test Parameter Information	Sample	Select according to sample actual situation. "rod" for rod shape and "special-shape" for parts.
	Exciting H(A/m)	Click the drop-down box to select. Note: The excitation magnetic field of the reference sample should be set as 25000A/m, while the maximum magnetic field of other samples should be set according to the drop-down box.
	Estimated Hc(A/m)	User can select from the drop-down menu according to the rough range of coercivity. If the range of coercivity cannot be predicted, please set "<300" for the test and reset it according to the actual measured coercivity value after testing.
	Test times	Users can set freely according to their needs, and generally set 1.
Record	Batch number	Input batch number

Parameters	Temperature	Input room temperature
	Tester	Input tester
	Remark	Input remarks
Test control button	Start test/Not connect	When the test system is connected normally, "Start test" will be displayed. Click it to test; When the system connection is abnormal, "Not connect" is displayed. In this case, the test cannot be performed. You need to check the wiring or check whether the machine is normally started.
	Cancel	Click "Cancel" to cancel the test during testing.
Result processing	Sort	After selecting the results and entering the qualified range of coercivity, the coercivity results not within this range will be marked as red.
	Result display	Display current sample measurement result or selected measurement result.
	History data	It can be searched by measuring time or record parameters; Record parameters include those entered in "Batch Number", "Tester" and "Remarks".

3.6 Measuring Operations

Steps	Operations
1. Set measurement parameters	Select sample type according to sample shape and set "Exciting H", "Estimated Hc", "Test Times". Among them, the Exciting H for reference sample set as 25000A/m, other samples generally select the max magnetic field to test.
2. Set record parameters	Fill in "Batch number", "Temperature", "Tester" and "Remarks".
3. Place the sample	a. Select fixture according to sample size: on the premise of ensuring that the sample does not protrude the biggest outside diameter of fixture, try to use smaller one. b. Place the sample horizontally at the front end of fixture in the direction with a large length-diameter ratio (or the specified measuring direction), push the slide rod to fix the sample and push the fixture into the test platform.
4. Adjust fixture selection knob	Adjust the fixture selection knob on the side of the test platform to the corresponding indicated position according to the selected fixture type (if equipped with large, medium or small). Note: there are only two effective positions for the knob, one position for the small fixture, and one position for the medium and large fixture.
5. Click "Start Test"	Click "Start Test", the software will automatically save and display test results and curve after finished testing.

3.7 Cautions

1. Please select the sample fixture selection knob on the side of the test platform strictly according to the model of sample fixture (small, medium, large).

Note: a. There are only two effective positions for the knob, one position for the small fixture, and one position for the medium and large fixture.

b. If the sample fixture and knob adjustment do not match, it will affect the accuracy and repeatability of the measurement results.

2. Make sure the size of the sample to be measured is less than the maximum outside diameter of the sample fixture

Note: If the size of the sample to be measured is larger than the maximum outer diameter of the sample fixture, there may be a collision sound in the measurement process; When the impact sound appears, please immediately press the "Cancel" button on the software operation interface or press the "ESC" button on the lower left corner of the DX-320HC host panel to cancel the test and replace the larger fixture. If the problem cannot be solved, please contact the manufacturer.

3. It is needed to judge the instrument is qualified or not, please test the reference sample. Magnetic field is 25000A/m, select "Rod" for shape, and test for 3 times, if the deviation from the standard value is less than 2% and the data fluctuation is less than 5 A/m, the equipment is normal. If the above indicators cannot be met, please contact the manufacturer.

4. When the coercivity range of the tested sample is uncertain, the predicted coercivity range can be set as less than 300, and the appropriate range can be selected according to the test results.

5. For samples with small length and diameter ratio, the demagnetization field is large, and it is difficult to magnetization and saturation. The test coercivity is lower than saturation value. At this point, the test results are generally for relative comparison, they can be compared when with the same test conditions. If the higher magnetic field needs to be tested in special case, please contact manufacturer for assistance.

6. As for the measurement direction of sample, generally choose the direction with larger length and diameter ratio. If it is regular square, it can be tested according to the working magnetic circuit direction. If there is any doubt about the working magnetic circuit direction, please contact manufacturer for support.

7. Do not turn off DX-2012SD directly during the test. It is in emergency, please press "ESC" on the panel of DX-320HC to quit test then press the switch to power off DX-2012SD.

8. During the operation of equipment, please do not place articles on the inlet and outlet of the equipment, which may affect the dissipation of the equipment.

3.8 Common Wrong Operations

3.8.1 Following error operations may cause damage to equipment or effect service life of it.

1. Do not turn on/off equipment according to operation sequences.
2. When instrument alarm, do not treat according to operation instructions. Common error operation is directly power off instrument when alarm.
3. The test sample size over the maximum diameter range of the test fixture, which cause the vibration coil inside the test platform to hit the test fixture and damage the vibration coil.

3.8.2 Following error operations may lead to test (data) abnormal.

1. There are metal (magnetic) objects placed around the test platform during testing.
2. Move the fixture or test platform when instrument in the state of testing.
3. No suitable test fixture is selected, for example large size test fixture for small size samples.
4. The sample placement is not standard, mainly in the following cases: the sample is not placed in the front end of test fixture; the sample is not parallel to the axial of the test platform; the sample is not secured during the test.

3.9 The Following shall be Operated under the Manufacture Authorization

1. Without the authorization of manufacturer, user can not revise the instrument system parameters.
2. Without the authorization of manufacturer, user can not open the cover to maintain the instrument.
3. Without the authorization of manufacturer, user can not re-install the operating system of computer.
4. Non-professional testers should operate the instrument under the guidance of professional testers.

In case above operations shall be carry out, please contact us in time. Professional engineer in or company will support you. If the user has carried out the above operations without authorization and caused instrument damage, our company will not provide free warranty service (within warranty period).

Chapter 4: Maintenance

4.1 General Maintenance

4.1.1 Instrument Calibration

DX-320HC Coercimeter is the special equipment and it can only calibrate by professional engineers. We attach one set of reference sample with the machine and together with the report of the sample. When you test the reference sample, if the test data and values in report is over the instrument technical data, please contact the manufacture, we will provide the consulting service in time.

4.1.2 Replace Fuse

The fuse lies under the power socket of the rear panel of the machine. After take out the power line, use the tweezers or directly by hand to take out the fuse and change it with the spare fuse.

4.2 Daily Maintenance

1. If the machine is not used for a long time, please turn on the machine regularly, it is recommended once a week and each time not less than 30 minutes.
2. If the machine is used in the production site, it is recommended to clean the dust every month. The method is: open the upper cover and use a vacuum cleaner to clear the dust and metal debris in the chassis.

4.3 Common Faults Analysis

S/N	Fault description	Causes	Solutions
1	Buzzer alarm, "ALARMRESET" on front panel turn light.	Test power supply is over current or over voltage.	1. Press "ESC" on front panel of DX-320HC to cancel test. 2. Press "ALARMRESET" on front panel of DX-2012SD to cancel alarm. 3. Check the primary wire BN1 between test platform and terminal box is connected well or not. 4. If the alarm cannot be canceled or it still alarm after above checkout, please turn off the machine and contact manufacturer.
2	Instrument does not work after click "Start Test".	DX-320HC is under abnormal code state.	Restart the whole test system, if not solved, please turn off the machine and contact manufacturer.
3	Test failed	Sample is too small or induction signal is too weak.	1. Check whether the test fixture is suitable or not, the smallest possible fixture should be adopted. 2. Check whether the sample is placed according to step 3 in operations.
4	Test data is abnormal, repeatability or accuracy is not up to standards.	Induction signal is too weak.	1. Check whether the test fixture is suitable or not, the smallest possible fixture should be adopted. 2. Check whether the sample is placed according to step 3 in operations.
5	When the test platform starts to vibrate, the test fixture pops up.	Test sample size is over the maximum size of test fixture.	Select larger diameter test fixture, if the largest fixture can still fail, please contact manufacturer to customize test platform.

Chapter 5: Warranty**5.1 Description of Warranty**

The warranty period is 18 months (except for fragile parts). It begins on the date of delivery of the product.

During the warrant period, our company provides free service except for artificial damage.

Our company is responsible for lifelong repair, and charge appropriately for repair service out of warranty period.

5.2 Items Excluded from Free Warranty

The warranty period does not apply to fragile parts.

The warranty period does not apply to parts defect which are due to accidental or error operation.

The warranty period does not apply to defects of product result from disassembling equipment or replacing parts without authorization from Dexing.

The warranty period does not apply to defects of product results from Force Majeure (such as flood, fire, typhoon and other natural disasters and accidents).

The warranty period does not apply to defects of product result from improper or inadequate transport, use and maintenance (such as: damp, corrosion, rotten and mechanical damage).

Appendix 1 Symbol, name and units

S/N	Symbol	Name	Unit	Remarks
1	B	Magnetic flux density	T; mT; Gs	
2	ϕ	Magnetic flux	Wb; vs	
3	H	Magnetic field strength	A/m; A/cm; Oe	
4	I	Current	A; mA	
5	Hc	Coercivity	A/m; A/cm; Oe	

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