

Xiamen Dexing Magnet Tech. Co., Ltd

Coercive Meter Meter

DX-320HC User's Manual



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We provided this manual with the equipment. Please read this manual carefully before you put the equipment into use, which will help you make better use of it.

Please keep this manual properly as a part of the equipment, so that the operators can refer to it when needed.

Although this manual has been carefully checked, mistakes can never be avoided completely. If there is any ambiguity, please contact Dexing Magnet Tech. Co., Limited. Our company does not assume any responsibility for the printing errors and users' misunderstandings about the manual.

Our company has been committed to the continuous improvement of products; the contents of the manual are subject to change without notice.

The final interpretation of this manual owns to Dexing Magnet Tech. Co., Limited.

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Chapter 1 Introduction

1.1 Illustration

1.2 Usage

1. This instrument is semi-automatic, which loading and unloading sample manually. It can automatically test after parameters inputted, which improves the accuracy of test and save the cost of human.

2. The instrument is used for measuring the coercivity of soft magnets.

OPERATION WARNING

1. Operators should carefully read this manual before putting the instrument into use.

2. The installation, operation and maintenance should have especially-assigned person to conduct according to this manual.

3. If there is any fault of the instrument, please contact with our company for maintenance, it may destroy the instrument and even threat to human life, if you maintain it without notice to our company.

1.3 Parameters

Items	Parameters					
Type of samples	Soft magnets such as electric pure iron,					
	permalloy and silicon steel.					
Measurement Range	5-1000A/m					
Resolution	0.01A/m					
Repeatability	±1%					
Accuracy	±2%					
Max. Magnetic field	40KA/m					
Power Supply	AC220V±10% 50/60Hz					
Dimension(L×W×H)	800×200×220					
Cabinet Dimension(L×W×H)	700×600×1000					
Gross Weight	About 100KG					
Total Power	About 2000W					

Chapter 2 Operation

2.1 Safety Precautions

Please operate this instrument after fully understand the contents of chapter 4. Please

check all the safety devices regularly.

Preparations before putting the instrument into use:

1. Keep clean around the machine to avoid accidents.

2. Do not take off the shields of all safety devices.

3. When the instrument is running, please do not touch any operating and moving parts of

it.

4. Turn off the power supply after finish testing.

5. Completely understand all the safety nameplates on the machine, and do according to them.

2.2 Power on/off Instrument

After installation, It is needed to check the voltage before power on. Please check the output voltage of transformer. If you do not use the transformer, check the voltage at main power switch. The voltage of this instrument is 220V 50/60Hz.

CAUTION:

If you ignore the above operation, it may cause deadly damage to the control system.

2.2.1 Power on

- 1. Inspection and preparation before power on;
- (1) Each button works reliably;
- (2) There is no foreign objects on all the transmission shafts;
- 2. Manage and indicate of power

Connect the power plug to power (AC220V), and turn on patch board, coercive force meter, and DX-2010SD successively. (Power switch of patch board as following picture.)



Figure 2-1 Patch board

2.2.2 Power off

Turn off DX-2010SD, coercive force meter, and patch board successively.

CAUTION:

1. Only electric technical can conduct the work of wring the power line.

2. High noise tools, such as electrical welding machine, electric tools may affect the running of machine, please keep these tools away from it.

3. Do not touch any switch with wet hands.

4. Before daily maintenance of control cabinet, make sure power off and press down the emergency stop button.

2.3 Safety Precautions before Operation

1. Check out following items before running the machine:

- (1) Make sure the input power is 220V/50Hz.
- (2) There is no any objects at the moving parts of machine.
- 2. Check out following items after power on:
- (1) Make sure there is no alarm or abnormal noise.
- (2) Make sure there is no objects on the moving parts.
- 3. Check out following items during the operation.
- (1) Make sure there is no abnormal noise, temperature and peculiar smell.
- (2) Make sure all transmission parts works well.



2.4 Operation Panel and Buttons

Figure 2-2 Coercive Force meter

1. Power Switch

Switch of the power of Coercive Force Meter,

2. Test Start Button

Under the condition of instrument running well, press down this button, the instrument will automatically test.

3. Display

It is used for displaying the instrument state and test results.

4. Keyboard

It is used for setting parameters or checking the operation.

2.5 Software Interface

1. Select Device Mode

Press "Mode" key to select menu, with ▲, ▼ keys to select category and confirm by "Enter" key; "Esc" to cancel.

(1) Parameters Explanation

Smart Mode: It is suitable for unknown sample which are above 20A/m, the test time is relatively long for this mode. It can be used to detect the coercivity range of sample, then use the manual mode to test.

Manual mode: It is suitable for sample with known range of coercivity. It is used together with "4" key sample coercivity range.

Fast Mode: It is suitable for unknown sample which are above 1000A/m, here the affect of geomagnetic field can be ignore.

(2) Setup Interface



Figure 2-3 Select device mode

2. Magnetization Set

Press "3" key to enter into set menu, with ▲, ▼ keys to select category and confirm by "Enter" key; "Esc" to cancel.

(1) Parameters Explanation

MaxStrength:025000A/m : Max magnetization field.

HysteresisTimeMax(ms): 500.00: Max Hysteresis time is depended on the material of sample, it is recommend to set it as 300.00.

(2) Setup Interface



Figure 2-4 Magnetization set

3. Sample Range Setup

Press "4" key to enter into advanced menu, with ▲, ▼ keys to select category and confirm by "Enter" key; "Esc" to cancel.

(1) Parameters Explanation

HcjValueMin: 20.00: the lower limit of coercivity

HcjValueMax: 300.00: the upper limit of coercivity

Caution: When measure sample below 20A/m, the upper lower should be less than 20.00A/m.

(2) Setup Interface



Figure 2-5 Sample range setup

2.6 Operation

1. Check out and make sure all the connecting wires are normal.

2. Turn on the power of DX-840, you will hear one sound of "Di".

3. Turn on the switch of IO switching box, and the indicator light of ModeA in IO switching box turn light.

4. Turn on the power of Coercive Force Meter, and the indicator light of ModeB in IO switching box turn light.

5. Turn on the power of DX-2010SD after 3 seconds, the control box automatically zero of

DX-2010SD.

6. After DX-840 finish initialization, and the control box will reinitialize DX-840.

7. Put the sample on the fixture after zero; make sure the right and left position of transmission fixture do not move randomly.

8. Press "3" key to setup the magnetization parameters.

9. Press "4" key to setup the coercivity range of sample, it should follow the following rules:

(1) When below 50A/m, set the lower limit as 0.1 and upper limit as 50.0, meanwhile, it is needed to select "Manual Mode" as the work mode.

(2) When high than 50A/m, set the lower limit as 50.0, the coercivity upper limit of sample as upper limit, meanwhile, it is needed to select "Manual Mode" as the work mode.

(3) If the coercivity of sample is very high, and want to get the approximate value rapidly;

set the sample coercivity range, and meanwhile, select "Fast Mode" as work mode.

10. Press "Mode" key to select the work mode.

11. Press down the "Test start button" to wait for finish testing automatically.

12. Take out the sample after the transmission fixture back and stop.

13. Repeat steps 11 and 12, after you change the sample on the same serials.

2.7 Cautions on Pick-and-Place Samples

1. When push the fixture, uplift it gently and push it into the test platform towards the left.



Figure 2-6 Pick-and place samples



Figure 2-7 States of fixture

Already pushed into

2. Put in the sample on the "Placing sample side".



Figure 2-8 Sample placing side

3. Use the assistive tools to pick and place the small samples.



Figure 2-9 Assistive tools for taking samples

Chapter 3 Adjustment of Instrument

3.1 Principle Diagram

Following is the electric principle diagram of measurement system:



Figure 3-1 Principle diagram

3.2 Structure Diagram



Figure 3-2 Structure diagram

3.3 Solenoid

Solenoid is a triaxial coils. In physics, the item "solenoid" means the multiple winded wire, the wired internal is empty, when there is current cross the wire, the internal of solenoid will produce the uniform magnetic field.



Figure 3-3 Solenoid

3.4 Detection Device

The detection device is composed of motor, transmission mechanism and detection mechanism. The detection mechanism installed on the transmission mechanism, with the drive of motor, detection mechanism fast and accurately move along with the linear guide-way to detect the work-pieces and send the data to the Coercive Force Meter for





3.5 Feeding Fixture

The feeding fixture is composed of pressing module, adjust module and fixture box, which is used for locating work-piece rapidly and accurately.

3.5.1 Manual Feeding Fixture

Put the work-piece into the fixture manually, pull the adjust module downward can rapidly adjust the pressing module, when the pressing module is near the work-piece, release the adjust module and then rotate nut clockwise; screw moves towards left and press and hold the work piece.

WARNING: The diameter of work piece should be less than the outside diameter of fixture box.



Figure 3-5 Feeding fixture

3.5.2 Auto Feeding Fixture

Put the work-piece into the fixture manually, rotate nut clockwise; screw moves towards

left and press and hold the work piece.

WARNING: The work-piece should be not over the yellow line.

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Chapter 4 Safety Precautions

4.1 Recognize Safety Marks

Please carefully read this manual and all the safety marks carefully before set, adjust, operate and maintain this machine.

All the safety marks have been displayed in this manual, please confirm the position of them in the machine.

All the safety marks in this machine are indicating as DANGER, WARNING, and CAUTION, the specific meaning of them are as follows:

DANGER: It means the position is the danger area, it may lead to dead or serious personal injury if carelessness.

WARNING: It means the position has potential danger, it may lead to dead or serious personal injury if carelessness.

CAUTION: It means the position has potential danger, it may lead to certain personal injury if carelessness or damage to parts of machine.

In the following pages, there will introduction of the position and content of safety marks, please read it carefully.

4.2 Safety Marks





4.3 Emergency Stop Button

When there is emergency conditions, such as fire, earthquake, lightening, or other emergency conditions which need to stop the machine, press "Esc" on the keyboard. Under this condition, the machine will stop testing and back to the initial position and enter into the stop condition.

4.4 Safety Devices

4.4.1 Functions of Safety Devices

- 1. It can find out the running problems of the machine.
- 2. It can emergency stop the machine on dangerous condition.
- 3. It can avoid non-performing products.
- 4. It can avoid the damage of machine.

4.4.2 Purposes of Safety Devices

- 1. Considering that the operator may inattention when the machine running automatically.
- 2. Reduce the loss of the machine and around devices.
- 3. Make sure the quality of product when night-time running or automatically running.
- 4. Convenient to maintain and detect when there it is abnormal.

4.4.3 Kinds of Safety Devices

The first one: Emergency button.

The second one: Area sensor.

4.5 Safety Operation

Please read carefully the following items when operating the machine.

1. DANDER

(1) When machine is running, do not strength your hands or fingers into the stroke range of the machine.

(2) Forbid to touch the high voltage parts, close all the safety doors and safety covers when the machine is running.

(3) Forbid to alter the machine and the control units.

(4) Press down the emergency stop button when there is any emergency conditions, and restart the machine when the danger released completely .

2. WARNING

(1) Do not turn off or release the safety devices when the machine is automatically running.

- (2) Before the machine completely stops, the safety door is forbid to open.
- (3) Make sure all the safety devices works well before running the machine.

3. CAUTION

- (1) Connect the wire correctly to avoid electric out of control caused by outside factors.
- (2) Make sure the fixture works well before running.
- (3) Maintain the machine according the requirements on chapter 6.

4.6 Preparations before Power on

- 1. Completely understand the following items before power on.
- (1) Confirm the condition of emergency stop button, all the safety devices and doors.
- (2) Familiar with all the safety items.
- (3) How to emergency stop the machine when it is abnormal.

- (4) How to power on/off the machine.
- (5) How to modify and eliminate for incorrect operation.
- (6) How to cut off the main power.
- 2. To avoid personal injury, make following preparations before power on.
- (1) Wear the work cloths, and do not wear necklace and necktie.
- (2) Do not operate the instrument if you feel uncomfortable of your body.
- (3) Clear out all the danger factors around the instrument.
- (4) Do not turn off or dismantle the safety devices randomly.
- (5) Make sure all the fixed screws have been tightened.

4.7 Safety Measures on Automatically Running

It is needed to maintain the instrument at regular intervals so as to make sure the high accuracy and quality of products; to keep the device performance and to avoid accidents. Check the instrument according the working environments and the shape of supplied materials. Please check the machine according to the following items:

- 1. Clean the machine timely to avoid the affect of product quality.
- 2. Operate the machine according to the operation to avoid the accidents.

3. If there is any abnormal conditions, please ask the technician to deal with it, and consult Dexing if it is necessary.

4.8 Attentions on Installation and Adjustment

1. Make sure there is no interference at the moving parts before operation.

2. Do not try to test samples out of the range of machine, Dexing do not responsible for any results caused because of operation against rules.

- 3. Do not modify control loop without the permission of Dexing.
- 4. Do not place any tools inside the machine.

4.9 Machine Maintenance

1. Only skilled worker or trained person can maintain this machine.

2. Do not dismantle or turn off all the safety devices, except for maintain or change them.

3. When change the fuse, check out the reason of burn out and change it with the same specification one.

4. When maintain machine and electric device, do not apply too much pressure, shock and shake to them.

5. The connector of electric is fragile, take care of it.

4.10 Safety Precautions after Operation

1. Power off the main power supply.

2. Clean out the internal of machine.

4.11 Fireproofing Precautions

1. Keep the machine away from the fire.

2. Conduct the daily maintenance.

3. Make the machine work on its range, and comply with the safety precautions on the manual.

4. Carefully adjust well the rack, to avoid the outside danger factors which are caused by vibration.

5. Make sure the lubricating devices and pats with lubricating oil works well.

4.12 Emergency Treatments

1. Need to leave the scene immediately.

When it is needed to leave the scene immediately because of fire, earthquake and thunder.

2. Suppose there is time before leaving.

Cut off the main power supply immediately.

3. Suppose it is needed to leave immediately.

Leave the site immediately after pressing down the "Emergency stop button".

4. Power failure.

Turn off the power switch when power failure.

5. Re-operate.

Re-operate the machine after the emergency conditions; operate according to the following orders.

- (1) Carefully check the fixture and machine, change or maintain them if necessary.
- (2) Restart the machine according to the orders in this manual.

Readjust the horizontal according to actual condition.

Chapter 5 Placement and Transportation

5.1 Select the Placement Site

To grantee the stability of working accuracy, the affected factors should be considered when installing are the distance to the power supply; strength of ground; around temperature and humidity; exhaust and sunning; affect by the around electrical equipment and high frequency instruments. Pay attention to the following items when installing:

The requirements of the ground:

1. The supporting capacity of the ground should be 1ton/m²[205lb/ft²], and the thickness requirement is above 100mm[4.0"].

2. The install area should at least 300mm[11.8"] equipment peripheral.

3. The ground should be flat and solid. If it needed for the cable channel, dig along with the side boundary of the install area.

4. Install on the cement ground is forbidden.

5. Make sure there is space for daily maintenance.

5.2 Setup Standard

WARNING: If the below items have not been complied with, it may lead to the fast movement of machine and may caused serious personal injury.

1. The voltage of this machine is 220V(±10%), transformer can be equipped.

2. Separate power line with machines which have high current fluctuate, such as: argon arc welding machine, electric resistance welding machine, high frequency dryers and electric discharge machine.

3. Install the instrument 20m[66ft] away from the machines with high current fluctuate.

4. The earth wire should be not less than 2.5 ml[A.W.G#3], and not share it with other machines.

5. The ground resistance should be 100Ω , or less than it.

6. The distance should be 5m[16ft] between the machine and strong noise devices.

7. If the factory use leakage protector, the sensitivity of cut-out switch should be 100mA.

The circuit switch may abnormal close if the sensitivity is less than 100A/m.

5.3 Transportation

Use truckle, forklift or hook to move the instrument.

1. Lifting machine

WARNING: If the below items have not been complied with, it may may caused serious personal injury.

(1) The weight of machine is about 150kgf, the nylon rope or wire-rope can be used when hanging the machine. Make sure the rope can fully hang up the machine. When use the wire-rope, make sure it do not scratch the surface of the machine.

(2) The rusty, obsolete wire-rope and nylon rope are forbid to use.

2. Use the forklift

(1) The weight of machine is about 150kgf, select the suitable forklift according to the weight.

(2) Another commander is needed, except for the forklift driver, to avoid the damage of machine during the moving.

(3) Keep the stable position after lifting.

3. Use the Truckle

The built in truckle is used for short distance moving indoor. Take out the sizing block firstly, then move the machine.

5.4 Installation

1. Use the crane or forklift to move the machine to the install area.

2. Screw the anchor bolt before putting the machine on the ground.

3. Lay the heel block.

4. Slowly lay down the machine and make the anchor bolt fall to the recession of the heel block.

5. Adjust the horizontal of the machine.

Lay the machine according to the scratch of heel block. Slowly lay down the machine when the four heel block in the correct position. Adjust all the balance adjust bolt to make the machine preliminary horizontal on the left and right side and slightly incline on the front and back side 1.15 degree(front higher and back lower). Screw the lock bolt upward top the surface of the machine. Reconfirm the horizontal of the machine.

6. Connect the power line and earth wire on the main power cut off device which is inside the electric box.

(1) Cut off the power on the site or the factory.

DANGER: Make sure the power on the site or the factory has been cut off, otherwise it may cause serious personal injury or dead.

(2) There should be separate power cut off device for the convenient of operator to power on/off the electricity.

(3) Connect the power of factory to the switch electric wire on the electric box and the ground wire connect to the ground terminal.

7. Specifications of earth wire and ground wire.

Thickness of power line (IV line or VCT)

Total capacity	R.S.T.	Earth wire
2kVA	4mm ² (A.W.G #10)	4mm ² (A.W.G #10)

5.5 Key Points for Checkout

1. Recheck the following items before turn on the machine on the new site.

(1) Turn on the power switch of factory.

(2) Confirm the voltage. Test the voltage for each 2-phase power line, to confirm the voltage in the range of $220V(\pm 10\%)$. If it is not in the range, then it is needed to install the voltage stabilizer.

- (3) Open the main power and cut off the switch.
- (4) Release the emergency stop button.
- (5) Power on by the operation panel. Test the machine by checkout procedures.

Chapter 6 Maintenance

6.1 Check Regularly

No matter whether there is problem of machine or not, users should check the machine regularly which can find out the hide problems, so as to reduce the loss. This chapter has the detail description of the check at regularly.

6.2 Daily Check

For daily check, it means everyday operator should check before, during and after the operation. All the key points of checking are in the following table. The sequence is consistent with the serial number in the table. Among them, the check of noise and abnormal noise should be conduct at any time.

Time	Serial	Key points	Description	
Before turn on	1	Work table is clean.	There is no materials or foreign	
the machine			matters on the working table.	
	2	Emergency stop switch	Check all the switches work	
			well.	
After power on	3	Lights on the operation	Check the state of lights and	
the machine		panel	buttons.	
	4	Safety devices	Check the state of safety	
			devices	
During	5	Abnormal noise	Check the noise on the moving	
operation			parts and sliding parts.	
	6	Synthetic check	Check the noise and	
			temperature.	
	7			
	8			
	9			

Daily check table

6.3 Monthly Check

Monthly check can prevent machine failure which do not found out on the daily check. It is more complex than daily check, but it is necessary. All the key points of checking are in the following table. The sequence is consistent with the serial number in the table.

Item	Serial	Key points	Method	Remarks		
Guide rail	1	Grease of	Visual	Keep clean, and wipe with		
		slider		grease.		
	2	Linear guide	Visual	Keep clean, and wipe with		
		rail		grease.		
Inductor	3	Outlook	Visual	No scratch, flexible response.		
Electric	4	Plug,	Visual and touch	Re-fix them if loose.		
cabinet		connector of	by hand			
		cable				
Position	5	Position of	Lay the fixture	Flexible to take in and out,		
device		locking block		otherwise slightly adjust by		
				screw the blot. If fail to adjust,		
				please call Dexing.		

Monthly check table

6.4 Check Every half an Year

It is for the easily ignore items, and consumables which do not need to change frequently. Do not neglect these check items, otherwise it may cause serious damage to the machine.

Chapter 7 Services

7.1 Warranty

1. Dexing Magnet Tech. Co., Limited. warrants each instrument of its manufacture to be free from defects in material and workmanship. Our obligation under this warranty is limited to servicing or adjusting any instrument returned to our factory for that purpose. The warranty period is 18 months. On returning the equipment under warranty, the buyer bears the costs for the shipment to Dexing and returning the device to the buyer. The buyer bears all the costs for shipment, taxes and duties, if the device is returned to Dexing from abroad.

2. The warranty period begins on the date of delivery of the product or later on the date of installation of the product if the product is installed by Dexing, the warranty period begins on the 31st day after delivery, provided that if you schedule or delay the Dexing installation for more than 30 days after delivery.

3. Dexing warrants the product only if it has been sold by an authorized Dexing employee, sales representative, dealer or Dexing headquarter.

4. The warranty period does not apply to defects of product result from improper or inadequate maintenance, repair or calibration; unauthorized modification or misuse; improper site preparation or maintenance. Caution: the hall probe is easy to damage; it's not in the warranty scope list.

7.2 Contact Information

Dexing is staffed Monday through Friday between the hours of 9:00 am and 6:00pm, excluding holidays.

Please contact us for technical questions, repairing and replacement etc.

Xiamen Dexing Magnet Tech. Co., Ltd

Add: Unit 404,4/F, No.993, Anling Road, Huli District, Xiamen, China 361012

Tel: (86) 592 5558386 Fax: (86) 592 5237901

http://www.magnetic-instrument.com/

Appendix: Packing List

Serial No.	Name	Model	Qua.	Unit	Remarks
1	Coercive Force Meter	DX-320	1	Set	
2	Fluxmeter	DX - 840	1	Set	
3	Hysteresisgraph	DX - 2010SD	1	Set	
4	Terminal box		1	Set	
5	Test Platform		1	Piece	
6	Standard Sample	Bar	1	Piece	With factory test reports
7	case		1	Piece	
8	Computer		1	Set	With monitor

CAUTION:

Check off each item on the above packing list as it is unpacked. Contact Dexing immediately if there is a shortage of parts or accessories.

Because the products of our company are in constant updates, the change of products without pre-notice.